



NITI Aayog
National Institute for
Transforming India
Government of India

National Health Stack

STRATEGY AND APPROACH

July 2018

FOR CONSULTATION



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Message from Member (Health), NITI Aayog



Dr Vinod K Paul

Member (Health),
NITI Aayog

In today's time, a strong health system is inconceivable without a strong and resilient digital backbone. The National Health Policy 2017 envisages creation of a digital health technology eco-system aiming at developing an integrated health information system that serves the needs of all stakeholders and improves efficiency, transparency and citizens' experience with linkage across public and private healthcare.

The need for a future-ready digital health system has become even more urgent with the announcement of *Ayushman Bharat*, Hon'ble Prime Minister's flagship program, that would herald a system level transformation of nation's health system. This historic initiative is designed with a powerful yet simple objective in mind: to scale up a wellness-oriented rather than illness-focused approach and to ensure cost-effective healthcare without financial hardship for all.

Ayushman Bharat comprises twin missions:

- i. Operationalizing 1.5 lac health and wellness centers offering preventive and primary care, on the supply side;
- ii. Financial protection of up to 5 lacs per year per family for the deprived 10 crores plus households towards secondary and tertiary care, on the demand side.

The National Health Stack (NHS) is a visionary digital framework usable by centre and state across public and private sectors. It represents a holistic platform that supports a multitude of health verticals and their disparate branches, and is capable of integrating future IT solutions for a sector that is poised for rapid, disruptive changes and unforeseen twists. It is now conceivable to aim for digital health records for all citizens by the year 2022.

The innovativeness of the proposed National Health Stack design lies in its ability to leverage a shared public good—a strong IT spine built with a deep understanding of the complex structures of the system. Various layers of the National Health Stack will seamlessly link to support national health electronic registries, a coverage and claims platform, a federated personal health records framework, a national health analytics platform as well as other horizontal components. The stack will embrace health management systems of public health programs and socio-demographic data systems. The population level base of such an IT system would be individual health record logged through the Health and Wellness Centres in rural areas and corresponding primary health care in urban areas.

The Strategy and Approach paper on the National Health Stack is a blueprint for India's futuristic digital health system that would undoubtedly be the very best in the world.

Message from CEO, NITI Aayog



Mr Amitabh Kant

CEO,
NITI Aayog

What will it take to Transform India?

This is the fundamental question that we at NITI Aayog ask ourselves: we seek to bring together states and the center to shape strategic policy actions that will accelerate India's progress towards becoming a global digital and economic powerhouse.

Universal health coverage is undoubtedly a key lever to achieving this goal. Not only does improved health security have the potential to transform individual well-being, it would also allow our nation to fully leverage our strongest asset: human capital. Recognising the significance of this agenda, the ambitiously designed Ayushman Bharat Programme (earmarked in Budget 2018) will work in Mission Mode to ensure healthcare for all—and particularly for the poorest and most vulnerable. Through both a rapid scale up of primary healthcare facilities and a comprehensive insurance plan allowing 50 crore individuals to access secondary and tertiary care, it would create the largest government-funded healthcare program in the world.

Achieving such scale requires us to rethink the core technology backbone of our system and leverage cutting edge digital solutions to tackle the challenge. The proposed National Health Stack (NHS) will thus deploy a powerful technology arsenal, from Big Data Analytics and Machine Learning all the way to Artificial Intelligence and a state of the art Policy Markup Language. The result? A complete redesign of the flow of people, money, and information, as well as a layered approach to providing comprehensive foundational health functions for all states and programs—grounded in an inclusive and interoperable technology strategy. Once implemented, the National Health Stack will significantly bring down the costs of health protection, converge disparate systems to ensure a cashless and seamlessly integrated experience for the poorest beneficiaries, and promote wellness across the population.

We hope that you will join us on this journey to developing a best-in-class healthcare information technology approach across the nation—one that the world would seek to emulate, and one which would become the cornerstone of India's public health system for years to come.

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Executive Summary

The Union Budget of the fiscal year 2018–19 laid the foundation for the Ayushman Bharat Yojana, a program designed to address health holistically through a two-pronged approach—

- Set up of 1.5 L Health and Wellness Centres for comprehensive primary healthcare offering preventive and promotive healthcare accessible to all.
- A flagship scheme Pradhan Mantri-Rashtriya Swasthya Suraksha Mission (PM-RSSM) which will cover 10 Cr+ poor and vulnerable families providing coverage up to 5 L per family per year for secondary and tertiary care hospitalization.

The PM-RSS Mission, which is expected to be rolled out by states themselves, seeks to converge multiple health protection schemes across states into one universal health protection scheme over time. This will be a key step towards achieving Universal Health Coverage (UHC) and Portability—which essentially translates into an environment where All people can obtain health services Anywhere in the country without suffering financial hardship or excessive indirect costs.

Through Ayushman Bharat, the Indian government has significantly stepped up its financial commitment in public healthcare. And while financing on demand side is critical, it is equally important to build a national digital infrastructure as an integral part of the program design to enable supply-side readiness. The PM-RSS Mission provides the right opportunity to build such an infrastructure.

In this document, we present the idea of a National Health Stack (NHS)—a digital infrastructure built with a deep understanding of the incentive structures prevalent in the Indian healthcare ecosystem. The NHS, a set of building blocks which are essential in implementing digital health initiatives, would be “built as a Common Public Good” to avoid duplication of efforts and successfully achieve convergence. Also, the NHS will be “built for NHPS but designed beyond NHPS” as an enabler for rapid development of diverse solutions in health and their adoption by states.

The key components of the National Health Stack are—

- A. **National Health Electronic Registries:** to create a single source of truth for and manage master health data of the nation;
- B. **A Coverage and Claims platform:** building blocks to support large health protection schemes, enable horizontal and vertical expansion of RSSM by states and robust fraud detection;

- C. A Federated Personal Health Records (PHR) Framework: to solve twin challenges of access to their own health data by patients and availability of health data for medical research, critical for advancing our understanding of human health;
- D. A National Health Analytics Platform: to bring a holistic view combining information on multiple health initiatives and feed into smart policy making, for instance, through improved predictive analytics;
- E. Other horizontal Components: including, and not restricted to, unique Digital Health ID, Health Data Dictionaries and Supply Chain Management for Drugs, payment gateways etc shared across all health programs.

The National Health Stack will facilitate collection of comprehensive healthcare data across the country. Designed to leverage India Stack, subsequent data analysis on NHS will not only allow policy makers to experiment with policies, detect fraud in health insurance, measure outcomes and move towards smart policy making, it will also engage market players (NGOs, researchers, watchdog organizations) to innovate and build relevant services on top of the platform and fill the gaps.

The design is geared to generate vast amounts of data resulting in some of the largest health databases with secured aggregated data that will put India at the forefront of medical research in the world.

We believe that with the adoption of this technology approach, the government's policies on health and health protection can achieve:

- **Continuum of Care** as the Stack supports information flow across primary, secondary and tertiary healthcare
- **Shift focus from Illness to Wellness** to drive down future cost of health protection
- **Cashless Care** to ensure financial protection to the poor
- **Timely Payments on Scientific Package Rates** to service providers, a strong lever to participate in government-funded healthcare programs
- **Robust Fraud Detection** to prevent funds leakage
- **Improved Policy Making** through access to timely reporting on utilization and measurement of impact across health initiatives and
- **Enhanced Trust and Accountability** through non-repudiable transaction audit trails.

Acronyms

AEPS	Aadhaar Enabled Payment System
APB	Aadhaar Payment Bridge
API	Application Programming Interface
BPL	Below Poverty Line
FMS	Fraud Management Service
KYC	Know Your Customer
NGO	Non-Governmental Organization
NHP 2017	National Health Policy 2017
NHS	National Health Stack
PHR	Personal/Patient Health Records
RSBY	Rashtriya Swasthya Bima Yojana
RSSM	Rashtriya Swasthya Suraksha Mission
SECC	Socio-Economic Caste Census
TPA	Third Party Administrator
UHC	Universal Health Coverage
UPI	Unified Payments Interface

Introduction

The Union Cabinet chaired by the Prime Minister Shri Narendra Modi in its meeting on 15th March, 2017 had approved the National Health Policy 2017 (NHP 2017) which states as its goal—

....The attainment of the highest possible level of health and wellbeing for all at all ages, through a preventive and promotive health care orientation in all developmental policies, and universal access to good quality health care services without anyone having to face financial hardship as a consequence.....

To this effect, The Union Minister for Finance and Corporate Affairs, Shri Arun Jaitley, while presenting the General Budget 2018–19, has announced two major initiatives in health sector, as part of Ayushman Bharat Yojana.

- (i) **Health and Wellness Centre:** 1.5 L Health and Wellness Centres will be set up across the nation to bring healthcare system closer to the homes of people. These centres will provide comprehensive Primary Health Care, including for non-communicable diseases and maternal and child health services. These centres will also provide free essential drugs and diagnostic services. The Budget has allocated Rs.1200 crore for this flagship programme.
- (ii) **Pradhan Mantri-Rashtriya Swasthya Suraksha Mission:** This second flagship programme under Ayushman Bharat will cover over 10.74 crore poor and vulnerable families (approximately 50 crore beneficiaries) providing coverage upto 5 lakh rupees per family per year for Secondary and Tertiary Care hospitalization.

For the first time, the policy positions health as a major national agenda linking outcomes to the economic development of the nation. These two health sector initiatives under Ayushman Bharat Programme, if delivered successfully, will realize its dream of New India 2022 and ensure enhanced productivity and wellbeing, avert wage loss and arrest impoverishment.

This document will introduce the concept of a shared digital infrastructure called the National Health Stack (NHS) to help achieve the desired **Continuum of Care** across primary, secondary and tertiary care.

The Rashtriya Swasthya Suraksha Mission has been identified for rapid rollout across states. Therefore, while the **National Health Stack** will be built in the context of RSSM, it will be designed for 'beyond RSSM' to support existing and future health initiatives, both public and private.

In the past there have been several health insurance initiatives by the central and state governments. Examples include the Rashtriya Swasthya Bima Yojana (RSBY), Rajiv Arogyasri in Telangana, Yeshasvini in Karnataka, etc. Each government-funded healthcare scheme has historically aimed to cover a section of the society that requires essential protection from sudden, large expenditures for treatment.

However, despite the right intent, government-funded healthcare schemes have faced several challenges in implementation, major ones listed below:

1. **Low enrolment of entitled beneficiaries**— The significant on-the-ground challenges of enrolling beneficiaries covered under various health schemes are a result of both poor process implementation and adverse incentives. As per National Sample Survey (NSS) 71st round (2014) only 11.3% of the bottom 40% population has any insurance coverage.
2. **Low participation by service providers**— Many hospitals and nursing homes decide not to participate or refuse to offer services post empanelment. The main reasons cited are low package rates compared to market, long payment times and lack of transparency in claims process. According to NSS only 4.5% of total hospitalization expenses are reimbursed to the bottom 40%. This results in high Out-of-Pocket Expenses (OOPE).
3. **Poor fraud detection**— The lack of robust systems makes it difficult to quickly identify and prevent health insurance fraud. This leads to funds leakage, long claims cycle time and increase in rejected claims owing to a conservative approach adopted by insurance providers. This creates a vicious cycle of disillusioned service provider who refuses to participate in such schemes which in turn pushes up the Out-of-Pocket Expenses (OOPE).
4. **Lack of reliable and timely data & analytics**— There are significant gaps in data availability and data quality across the system as of now. The absence of reliable and timely data aggregated at the patient level reduces quality of care, and at a systemic level puts significant constraints on policy makers to evaluate the performance of various players or measure outcomes in a consistent manner to make evidence-based decisions.

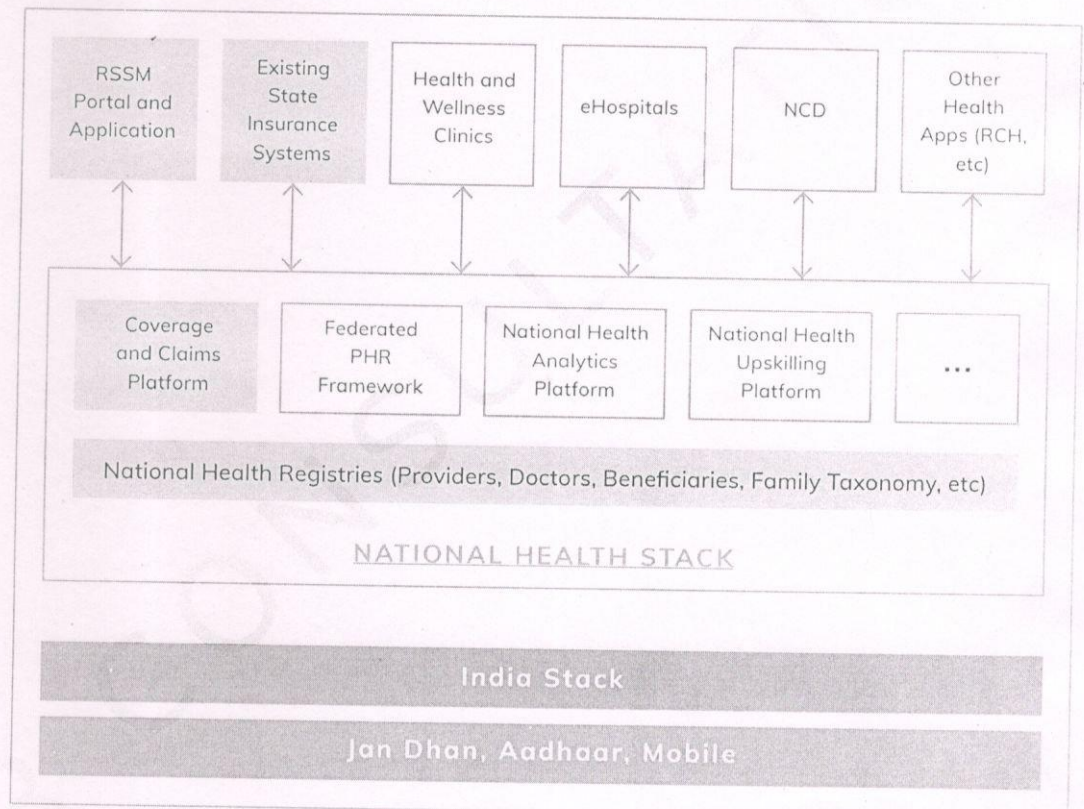
We are convinced that to address the above challenges, in addition to the issue of Portability of health services (in a country like India where health is a state subject), the National Health Stack (NHS) will prove to be the ultimate Game Changer. Built as a Common Public Good by the Centre for adoption by all states, it will eliminate any repetitive efforts on part of, yet retain autonomy for, the states—paving way for rapid rollout of various health initiatives, achieve convergence and accelerate the momentum to achieve the goal of Universal Health Coverage well ahead of time.

The scope of this document is limited to stating the vision, strategy and approach for the development of the National Health Stack. The document also contains an overview of the principles guiding the design and architecture of the National Health Stack and illustrates the two-track implementation approach of the NHS through the Rashtriya Swasthya Suraksha Mission. The operational details of building and rolling out the Stack including the delivery mechanisms and other related matters are beyond the scope of this document.

National Health Stack (NHS) Overview

The National Health Stack is designed to provide the *foundational components* that will be required across Ayushman Bharat and other health programs in India. The Health Stack is a nationally shared digital infrastructure usable by both Centre and State across public and private sectors. The Stack is designed to bring a holistic view across multiple health verticals and enable rapid creation of diverse solutions in health.

Exhibit 1:
The National
Health Stack—
High Level
Architecture



The National Health Stack is a collection of *cloud-based services*. Each service provides just one capability across multiple health services, accessible via *simple open APIs* compatible with global standards. Together they create a powerful framework to bring convergence and faster go-to market for any health initiative.

The scope of the National Health Stack includes (and is not restricted) to the following subjects: Induction of Private Hospitals and Private Practitioners into the Primary and Secondary healthcare ecosystem; Focus on Non-Communicable Diseases (NCD); Disease Surveillance; Health Schemes Management Systems; Nutrition Management; School Health Schemes; Emergency Management; e-Learning Platform for health, LMS, Telehealth, Tele-radiology; Diagnostic Equipment; Health Call Centre(s) etc.

Components of the National Health Stack

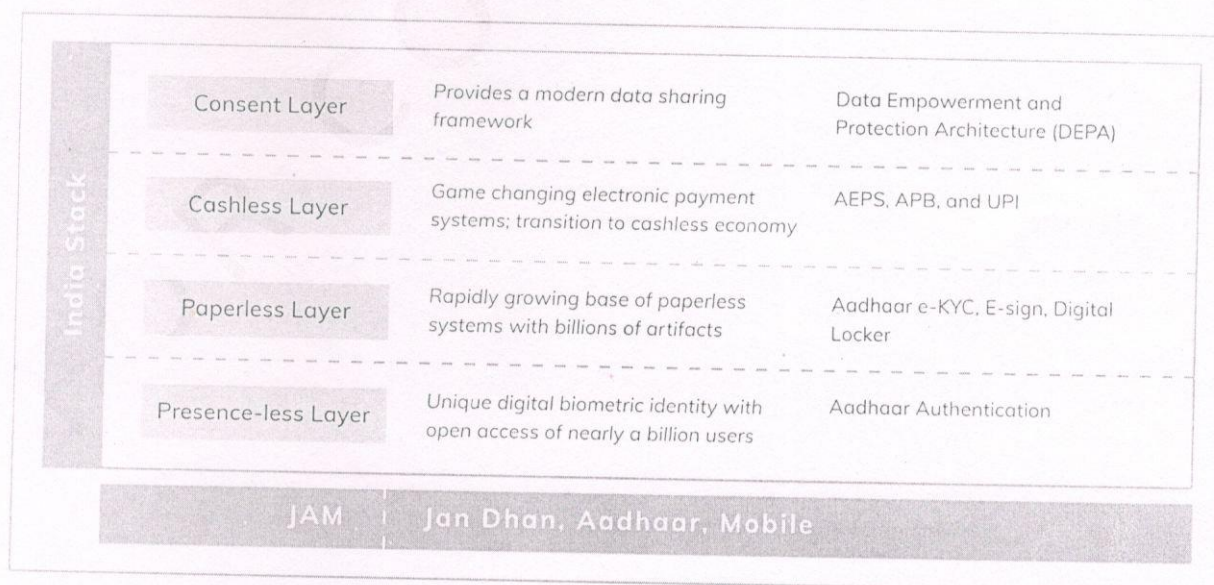
At a high level, the components of National Health Stack are organized in two layers. There is a *National Health Registries* layer, which forms the base of the Stack and houses the services required to manage the master data for all health programs. Above it, there is a layer of software services and platforms which encapsulate additional building blocks required for operationalizing programs. This includes a *Coverage and Claims Platform*, a *Federated Personal Health Records (PHR) Framework* and a *National Health Analytics Framework (NHAF)* amongst others. In the design of these components, the Health Stack utilizes various components of the *India Stack*, which we briefly describe below.

INDIA STACK

India Stack is a set of digital public goods which collectively make it easier for innovators to introduce digital services in India across a range of sectors.

Exhibit 2:
The India Stack

LAYERS OF INDIA STACK



India Stack has four essential layers:

1. **Presence-less layer**, which enables removal of barriers to people's participation in formal services through digital identities and remote authentication mechanisms;
2. **Paper-less layer**, which enables digital records to be moved with an individual's digital identity;
3. **Cashless layer**, which includes a set of payments services to ease monetary transactions; and
4. **Consent layer**, which empowers individuals to share their data in a safe and secure manner, thus enabling access to better financial, healthcare, and other services.

The widespread rapid adoption of basic bank accounts under the Prime Minister's financial inclusion scheme, the Jan Dhan Yojna (JDY); the digital identity called Aadhaar; and mobile phones, especially smartphones, has created a foundation (JAM) in India on which the India Stack operates.

More information about India Stack is available from <http://www.indiastack.org/>

ELECTRONIC REGISTRIES—MANAGING THE HEALTH MASTER DATA OF THE NATION

A lack of reliable and easily accessible master data is a core problem that affects current health systems: each vertical program in the government tends to maintain its own copy of data that is difficult to keep updated and restricts data sharing across programs. This, in turn, makes it difficult to get a holistic picture of care across programs. To overcome these challenges, the National Health Stack will incorporate a layer of electronic registries that will form the base layer of the Stack. This layer will be utilized by all programs which are built on top of the National Health Stack.

Registries will include data for various health-sector stakeholders, in particular (but not restricted to) healthcare providers (hospitals, clinics, labs etc), beneficiaries, doctors, insurers and ASHAs, and they may also contain data about other aspects of health programs like information on drugs and interventions. All registries will have open APIs for publishing and consent-based access by authorised entities.

Principles of well-designed registries

The registries in NHS will be developed with the following design principles in mind:

Self-Maintainability

Entities listed in the registry should be able to view their information and through appropriate workflows be able to update their information in a verifiable and trusted manner.

Non-Repudiable Data

The source for each attribute in the registry should be visible: viewers should be able to tell who added which information and when. All attributes should be digitally signed by the authorized updater. This leads to greater trust in the data and stronger accountability.

Incentive-aligned Design

Registry owners must attempt to enact mandates that require the entities listed by the registry to register and to keep their data up to date. Where mandates are not possible, suitable incentives need to be provided as part of the implementation process. For

example, empanelment of hospitals for health insurance must encourage the insurer or third-party administrator (TPA) to always obtain the information from the provider registry and not collect it directly from the provider. This ensures that the provider has an incentive to keep its registry entry up to date.

Extensibility and Flexible Schemas

Registry owners will have to set up a process to accept feedback and to update registry schemas. Health applications built on top of the Health Stack should be able to extend the base registries and use derived versions of them.

Open APIs

Creation, updation and retrieval of data must be possible using open APIs. For some APIs, entity authentication mechanisms must be implemented in order to ensure data security.

Controlled Data Visibility and Consented Data Sharing

Registries will offer fine-grained control and visibility over each attribute of an entity. Attributes can be public or private, masked or encrypted. Sharing of private attributes to a data requestor will require consented access.

Data Provenance

A non-repudiable audit trail must exist for all changes made to entries in the registry. In general, it should not be possible to delete data from registries, though it may be possible for the registry owner to mark certain entries as obsolete.

Approach and Considerations for designing Electronic Registries

While we do not present the detailed design of the registry layer in this document, we point out a few essential elements of the approach that will be taken to design two important registries: the *provider registry* and the *beneficiary registry*.

Provider Registry

The provider registry will be the one which will manage master data for all healthcare providers in the country. This will include hospitals (both government and private), clinics, diagnostic labs and other clinical establishments. Building a provider registry along the above design principles is essential for running any insurance scheme effectively and in running other programs which rely on ensuring veracity of provider data.

Multiple efforts are currently underway to build provider registries in India. This includes the National Health Resource Repository (NHRR) being managed by the Central Bureau of Health Intelligence (CBHI),¹ the NIN database² implemented by Ministry of Health and Family Welfare (MoHFW) and NIC and the Registry of Hospitals in Network of Insurance (ROHINI)³ developed by the Insurance Information Bureau of India (IIB). These efforts have thus far been disconnected from each other and are resulting in redundancy in datasets. The NHS provider registry will not only provide features like self-maintainability, non-repudiability and consented access of data, it will also attempt to unify existing efforts on provider registries and reduce the redundancy in these efforts. All existing registry implementations will be able to publish provider information securely to the NHS registry, on a per-provider basis or in bulk, and extract information from it for their respective programs. (These implementations will operate as applications on top of the Health Stack.) There will also be the flexibility to extend provider schemas defined in the NHS registry for individual use cases. In this manner, both

¹ http://dghs.gov.in/content/1370_1_CBHI.aspx

² <https://nin.nhp.gov.in/login.php>

³ <https://rohini.iib.gov.in/>

existing and future programs reliant on provider registries will be benefitted.

An important element of maintaining provider registries will be the role of a surveyor who will be tasked with physically visiting providers and validating registry data. The interfaces for surveyors and data validators will be defined and their role scoped out in detail.

Provider registries, as other registries like doctor registries and insurer registries, will have attributes for grading and scoring providers on different metrics; some of these grading mechanisms could be crowdsourced. Such information about providers will have a different approach for data update and access. There will be a facility to allow some entities in the healthcare ecosystem to create, update and access data about others in/from the latter's registries (e.g., beneficiaries will have the authority to grade providers and submit these grades to the provider registry). Such cross-entity access of information will also need to be scoped out.

Beneficiary Registry

Health programs are likely to use a variety of identifiers to identify the individual and family on the ground, and so the beneficiary registry in the NHS is designed to offer flexibility. The base entry in the beneficiary registry will be created with a link to a strong foundational ID such as the beneficiary's Aadhaar number. The registry would allow any number of other identifiers being used in the health system to be linked to the Health ID. This will not only enable a holistic view of the different programs that beneficiaries participate in, it will also enable efficient search and recovery of beneficiary details given program-specific identifiers.

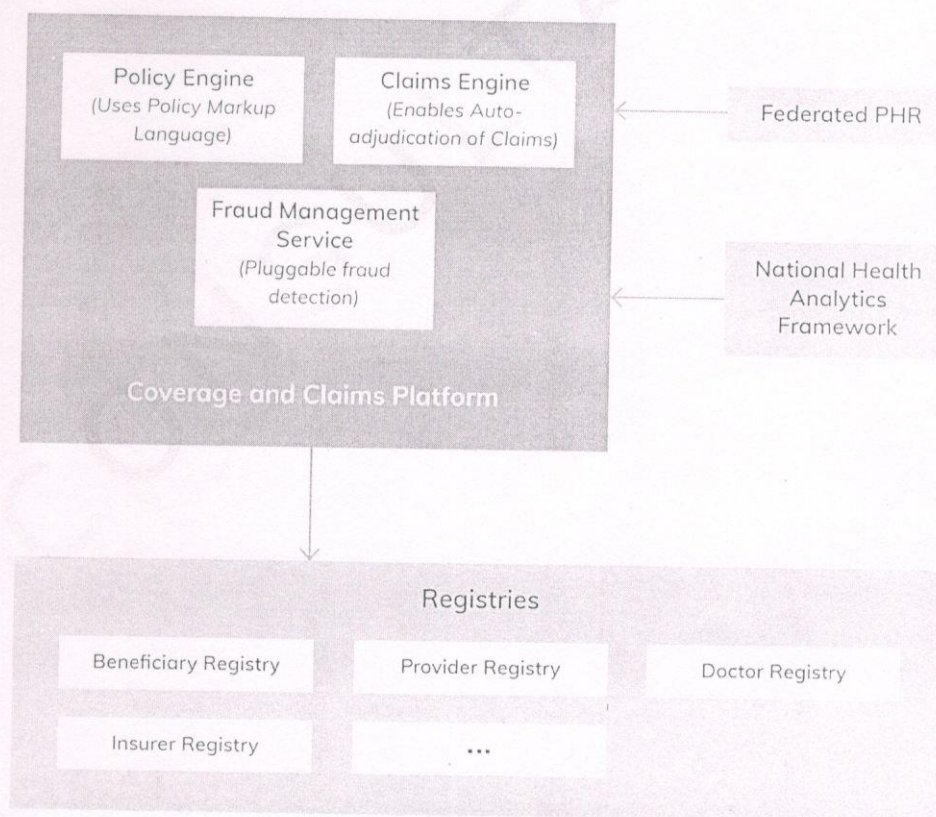
Beneficiary registries will also capture and store important beneficiary-to-beneficiary linkages e.g., information about a beneficiary's family will be available from the record corresponding to that beneficiary. The NHS registry will not assign any group IDs (e.g., family IDs) to beneficiaries although such attributes may be added by individual NHS applications.

COVERAGE AND CLAIMS PLATFORM

The coverage and claims platform provides the building blocks required to implement any large-scale health insurance program, in particular, any government-funded healthcare programs. This platform has the transformative vision of enabling both public and private actors to implement insurance schemes in an automated, data-driven manner through open APIs.

There will be three primary sub-components of this platform: a *policy engine*, a *claims engine*, and a *fraud management service*.

Exhibit 3:
Coverage and
Claims Platform
and linkages
with the National
Health Stack



Policy Engine

The Policy Engine is a service that allows defining and storing of insurance policies for individuals and families in a machine-readable format, and provides APIs to consume and update these policies. Two key components of this engine are a Unified Multi-Policy View per beneficiary and a new Policy Markup Language (PML).

Unified Multi-Policy View

The Policy Engine, through its APIs, will empower beneficiaries to get a unified view of all their health insurance policies in a convenient and user-friendly manner. This will cover both government-funded healthcare policies as well as private insurance policies that the beneficiary may have purchased.

Policy Markup Language (PML)

A key innovation in the NHS would be the idea of Policy Markup Language (PML), which would be a machine-readable language designed for describing, updating, accessing and communicating policies between software programs. The PML will enable health insurance policies to be written to cover their various attributes, including:

- The list of empaneled providers linked to the policy
- The coverage amount
- The coverage period
- List of procedures that are covered
- Pre-authorization requirements for procedures
- Pre-authorization approver details
- Hospitalization costs payable for each procedure
- Exclusion criteria for any procedures

To start using the coverage and claims platform, health insurance schemes will need to define a set of health insurance policies in the Policy Markup Language. The policy is uploaded and validated to be syntactically correct in the policy repository. Each policy will need to be accompanied with a digital signature, linked to the entity that is providing the coverage (e.g., insurance company or a health trust set up by the state). Only when the signature has been generated will the policy become active. The Policy Engine will allow policies to be activated at different times for each beneficiary. Activation requires that premiums that cover the beneficiary be transferred to the insurance company or

health trust. It is the responsibility of the Centre and State to ensure the the funding cycle for any government-funded healthcare programs is correctly managed so that policies do not expire and the poor and vulnerable do not suffer due to policy expiry.

Subject to the approval and successful demonstration of the technology, there could be a possibility for policies to be developed based on Smart Contracts, a derivative of Blockchain Technology. Smart contracts will enable policies to have intelligence embedded in them, which will allow each policy to directly interact with the Claims Engine (or other parts of the Stack). So, for example, policies would automatically be able to trigger insurance payments once certain conditions in the claims process are met.

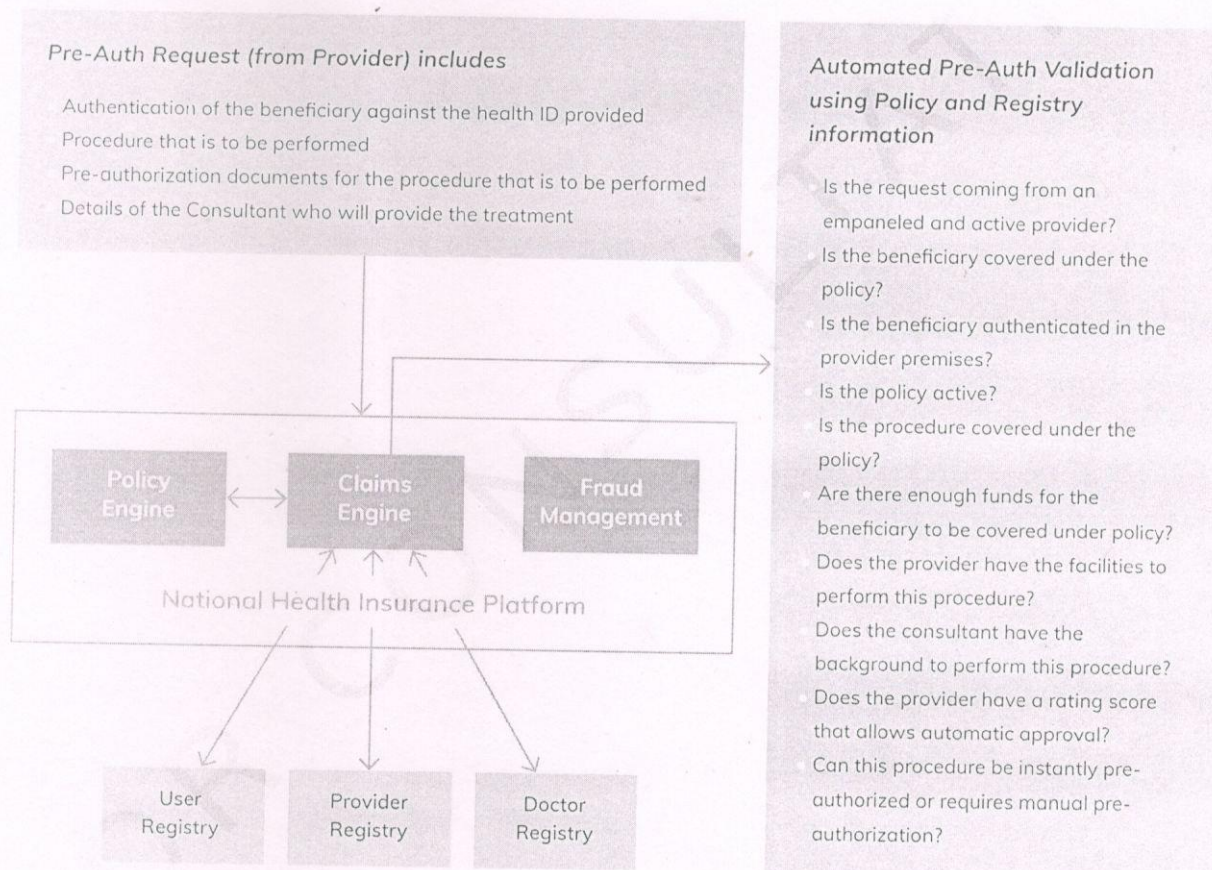
Claims Engine

Claims processing is the most vital component in the coverage and claims platform. The Claims Engine will manage the way claims flow in health insurance schemes and ensure ease of filing and settling claims. This engine will:

1. **Ensure auto-adjudication of claims:** A large part of the claims process (covering both pre-authorization and post-treatment claims processing) can be automated given machine-readable description of policies, as in the Policy Markup Language. The claims engine will accomplish this automation, which in turn will help insurers and third-party administrators (TPAs) in making faster decisions.
2. **Orchestrate the payment flow:** The claims engine will also send payment triggers and notifications to designated entities which will help ensure that insurance Service Level Agreements (SLAs) are adhered to and claims processing times are accurately reported to the authorities.
3. **Provide data points:** The claims engine will generate a rich data trail on the history of claims processed by the NHS, which will serve as the key input to the Fraud Management Service (FMS).
4. **Receive requests for audit:** The claims engine may also receive requests for audit on past claims from the FMS. In such situations, claims would be re-assessed and the resulting analyses provided back to the FMS. With better data, suspicious claims can be detected and analysed in this manner.

Claims in coverage and claims platform are settled within the time defined by the SLA of the insurance policy. The engine is responsible for ensuring that claims originating

in the system are adjudicated at the earliest. In order to do so, this component takes into account inputs from the external Fraud Management System (FMS) which recommends an action to be taken on the claim. For example, the FMS may recommend acceptance or advise TPA intervention for a newly filed and documented claim. If FMS recommends acceptance, the platform will auto-adjudicate the claim in accordance with rules specified in the policy.

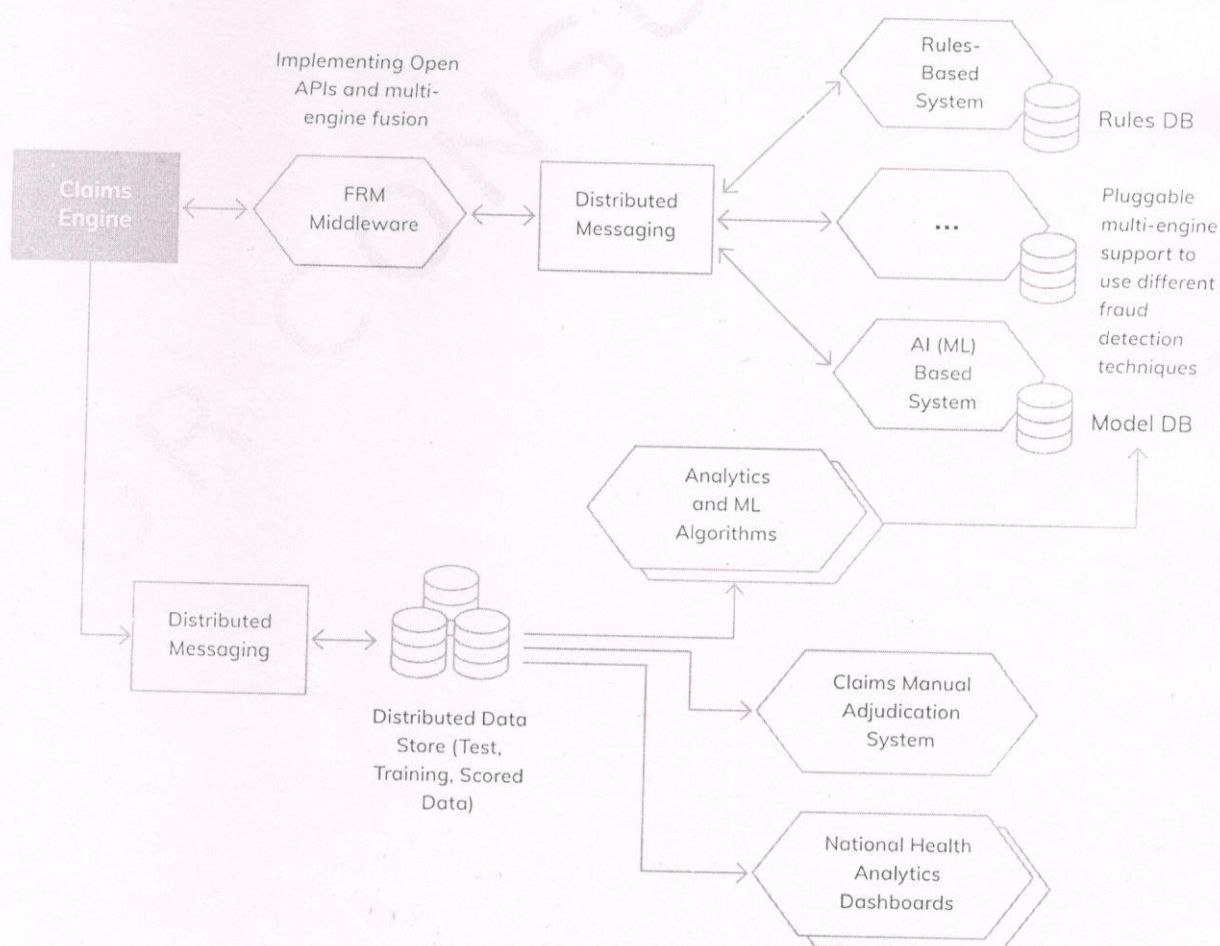


When resolving such re-assessed cases, detailed analyses is provided to the FMS as feedback, along with the case resolution.

Fraud Management Service

Fraud management processes are improved dramatically when its analysis is based on national scale data; this is possibly the greatest impetus for a shared digital infrastructure. The fraud management component is responsible for ensuring that the number of fraudulent claims settled by coverage and claims platform is minimized. The component aims to reduce losses due to dishonest claims and ensure that the healthcare system covers the people who need it the most.

Fraud Detection using big data analytics and machine intelligence is improving at a rapid pace. Thus, the fraud management service will be implemented leveraging multiple engines in an effort to encourage innovation. In order to maximize fraud detection rates and accuracy, the engines will be incentivized to report fraud events and will compete with each other in the process. This approach will boost the rates of true positives as well as the rate of true negatives in fraud detection. The data feed into the fraud management system will be anonymized to protect patient and provider privacy.



When a fraud is reported, all pending claim settlements and any new claim settlements for a hospital are placed on hold until the fraud raised can be investigated. Governments, insurance companies and TPAs are expected to have vigilance teams that investigate the fraud scenarios suggested by the fraud management service. The teams would need to decide as to whether it is a truly fraudulent scenario or an item incorrectly flagged as fraud. The FMS service gets the feedback from the same process.

Personal Health Records (PHR) are a core requirement to avoid fraud and bring greater trust into the claim handling process, as most fraud is based upon either unwanted or redundant tests and procedures, or claims made by patients/providers on false procedures.

DIGITAL HEALTH ID

The NHS will provide for a mechanism through which every user participating in the system can be uniquely identified. Accurate identification will greatly reduce the risk of preventable medical errors and significantly increase quality of care. It will enable users to obtain a longitudinal view of their healthcare records. Also, it will also drive out unnecessary costs by reducing inefficiency.

Upon successful registration of the user, a Digital Health ID (unique, system-wide identifier) will be created and provided to the registrant. The registrant may create a Virtual Health ID to preserve their privacy when interacting with other users or stakeholders in the system.

When enrolling into any Scheme, users will be able to provide one of many national identifiers (like Aadhaar, PAN card, Election ID, etc) to identify themselves as specified by the National Health Policy.⁴ Upon successfully completing KYC, these users will be registered by the system. The NHS Health ID is generated for each user upon successful registration in the system.

When a registered beneficiary approaches a service provider for Scheme-related facilities, she is expected to only provide her Health ID. This federated identification

⁴ The NHP Document (https://www.nhp.gov.in/categories-for-adoption-of-standards_mtl) from 2016 states the following: "A health record system must have provision to include patient identifiers of following types: (1) UIDAI Aadhaar Number (preferred where available), (2) Both of the following in case Aadhaar is not available: 2.1 Local Identifier (as per scheme used by HSP), 2.2 Any Central or State Government issued Photo Identity Card Number.

system ensures that a user is identified uniquely in the NHS without requiring additional national identities to be produced for each transaction. The user or stakeholder is securely verified via authentication provided by the NHS.

The Health ID may also be looked up in a secure manner if the beneficiary does not have her identifier handy. For example—a beneficiary visiting a provider, in the absence of NHS Health ID, may authenticate against Aadhaar. A secure verification process will ensure that the beneficiary is validated. The provider will then be able to look up this beneficiary's relevant information using this reverse lookup.

Like the Health ID, similar Digital IDs will be provided by the system to stakeholders like Government departments, insurers, TPAs and providers. Just as in the case of individual clients, identifiers will be assigned to these institutions only upon successful KYC for the institution. This KYC could be performed using a unique national ID already assigned to the institution (e.g., the institution's TAN number).

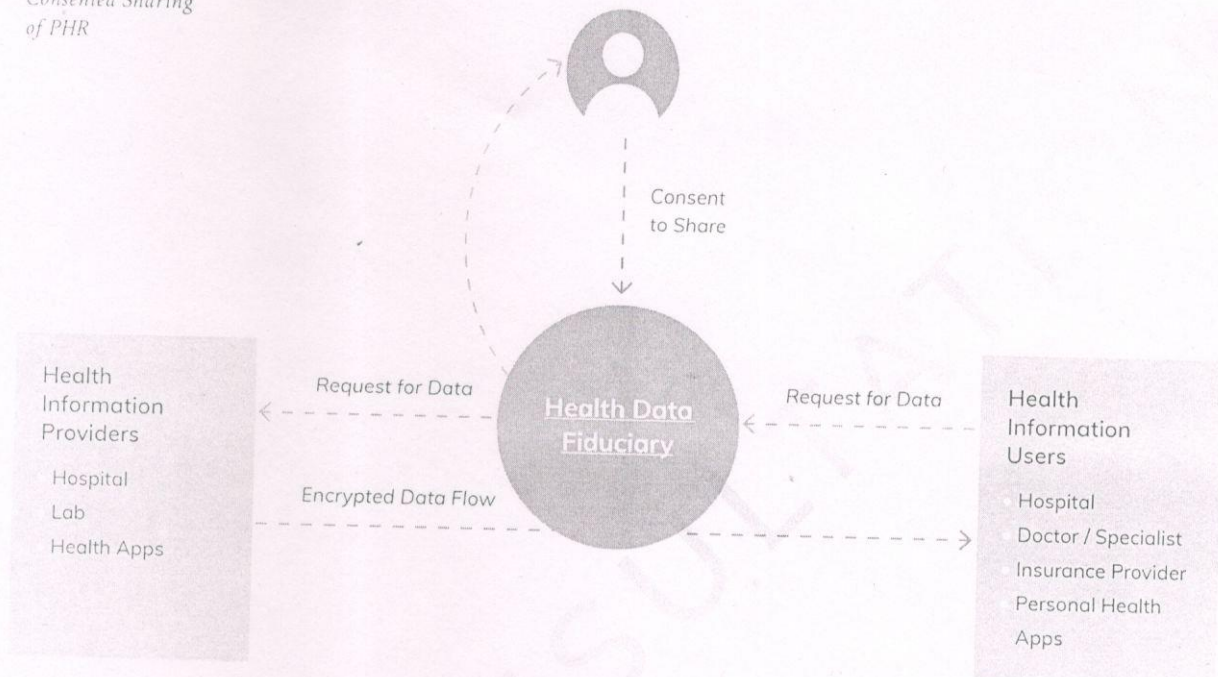
FEDERATED PERSONAL HEALTH RECORDS (PHR)

FRAMEWORK

This component of the Health Stack enables the management and aggregation of user health data, as well as the consent-based flow of such data across different stakeholders who require access in order to deliver value-added services to the user.

Personal Health Records (PHR) refers to the integrated view of all data related to an individual across various health providers, comprising of medical history, medication and allergies, immunization status, laboratory test results, radiology images, vital signs, personal stats such as age and weight, demographics and billing information, and multiple health apps. Because health data is sensitive, the design and implementation must ensure the right level of privacy and security for health data; thus, the PHR is maintained in a secure and private environment, with the individual determining rights of access. This will be made possible through Health Data Fiduciaries (trustees) that shall facilitate consent-driven interaction between entities that generate the health data and entities that want to consume the PHR for delivering better services to the individual.

Exhibit 4:
Health Data
Fiduciaries for
Consented Sharing
of PHR



A meaningful patient-controlled health-record infrastructure, made possible via Health Data Fiduciaries, will support the development of highly desirable health system qualities. First, it allows a patient to effectively become a health information exchange of one: as meaningful data accumulate in a patient-controlled repository, a complete picture of the patient emerges, resulting in an improved quality of care across a range of providers. Secondly, the federated structure of PHRs (with pre-authorizations built in) can facilitate the access to this valuable data in a consensual manner for the purposes of medical research (which in turn results in reduced cost and better health outcomes).

The key guiding principles for this framework are listed below:

1. **The Patient is the Controller of her data:**
True empowerment occurs when the patient is the controller of data rather than just the owner. Incentivised mandates for healthcare organizations to provide data to patients after an encounter through a standardized electronic mechanism (automated updates, for instance) has the potential to achieve a patient driven information economy in addition to inculcating a stronger partnership between patients and clinicians.
2. **Leveraging a Federated, rather than a Centralised Approach:**
A key aspect of the PHR framework is that it enables meaningful health data to be stored and managed in a *federated* manner: i.e. multiple entities (e.g., hospital systems, health-technology companies, etc.) will manage health data about users. User will be able to share their data via Health Data Fiduciaries (that will generate and manage consent) with data requestors. This will be achieved using standardized and open APIs through which these entities will be able to communicate with each other and with stakeholder systems. Such an approach to managing and sharing data has many advantages from a scalability and flexibility perspective over a centralized solution for managing health data.
3. **Privacy by Design:**
User data needs to be protected from abuse and compromise. The PHR framework will define data sharing mechanisms, using the MeitY Electronic Consent Framework,⁵ that gives the user control of their data and ensures privacy of user data ground-up. Tools to protect privacy of data must be in-built in the framework and best-practice guidelines should be in place for the framework users (hospitals, insurers, and other stakeholders) to ensure privacy of data.

⁵ Reference to *MeitY Electronic Consent Framework* (<http://dla.gov.in/sites/default/files/pdf/MeitY-Consent-Tech-Framework%20v1.1.pdf>)

4. **Minimal changes to existing health record formats:**

The diverse IT products used by healthcare providers in India do not follow a common standard for data storage and do not communicate with each other. Therefore, the framework must require minimal to no changes to existing IT products and must be designed to work with the existing IT infrastructure as-is.

5. **A clear incentive for providers to participate:**

Almost 80% of Indians seek private healthcare and pay out of pocket. In order to ensure the private healthcare providers participate, the framework should support built-in incentive structures to ensure rapid and universal adoption. Incentives and regulatory control need to be suitably balanced, in order to ensure maximum participation and innovation, and still ensuring user privacy and control.

6. **Open APIs:**

The framework should provide an *open* and *standard* set of application programming interfaces (APIs) for creating, accessing and updating records in EHRs, as proposed in the Policy for Open APIs by MeitY.⁶ The API definitions should be simple and follow the principles of minimalism and privacy by design. Some parts of the framework could be publicly available (as public goods) for any framework user to utilize.

NATIONAL HEALTH ANALYTICS FRAMEWORK

The National Health Analytics Framework will enable the creation of anonymised and aggregated datasets that assist in the creation of dashboards, reports, and other types of statistics. These aggregated datasets will present the overall direction of health of the country/state/district leading to data-driven decisions and targeted policymaking in the health sector.

In alignment with the National Data Sharing & Accessibility Policy (NDSAP),⁷ open datasets shall be published as part of this framework to increase transparency, accountability, civil society engagement, and innovations in service delivery.

A few examples of data which could be obtained through this framework are listed below:

- Average number of patients treated in a day
- Most commonly occurring diseases in India (Epidemiology)

⁶ http://meity.gov.in/sites/upload_files/dit/files/Open_APIs_19May2015.pdf

⁷ Reference to MeitY's National Data Sharing & Accessibility Policy (NDSAP) (<http://meity.gov.in/open-data>)

- Percentage of claims filed by the entities (Healthcare Provider, Doctor, or Beneficiaries) that are accepted/rejected (Resource Utilisation)
- Average billed amount / billed amount for a particular medical procedure
- Average time of settlement
- Treatment characteristics and procedures
- Years of experience of doctors across state/district/country.

While the National Health Analytics Framework will initially focus on Health Insurance, it will provide for “horizontal expansibility”—enabling the potential to cover, at a later point in time, important areas including (and not limited to) disease surveillance, predicting epidemics, classifying and clustering population segments for proactive care, nutrition, health schemes, and national health infrastructure such as telemedicine, teleradiology, and the enhancement of process controls.

Moreover, the treatment and patient care data in PM-RSSM can provide critical insights into the healthcare skill shortage at various governance levels (e.g. both the villager and block levels) and enable the implementation of skill development initiatives at a very granular level (for instance, through ASHA workers).

The National Health Analytics Framework will also help develop newly benchmarked standards in areas such as data formats, pricing, standard operating procedures in daily operations, and standard treatment procedures with optimal cost—whilst also providing the opportunity for continuous evaluation of National Health Policy. This will help shift evaluation away from an annual exercise towards a real-time approach, to help rapidly curate data collected through the insurance schemes and feed into agile smart policy decisions.

Guiding Principles for the Overall Design of the National Health Stack

1.

Mandated PHR

Every citizen has a right to not just her/his health data but also right to access to structured data. All service provider EHRs and stand alone PHRs which include wearables, mHealth devices and health apps etc should have APIs compatible to NHS PHR.

2.

Separating the Consent Layer from Data Flow is Key

It has been successfully implemented by India Stack while building the Universal Payment Interface. Patients may opt to (consent to) archive their data in one or more types of meta-directories that will then allow (or restrict) automated access for clinical, research, quality improvement, or marketing purposes.

3.

Interoperability through Open APIs and Open Standards

Interoperability is essential for our solution to be able to support a large number of applications. NHS must be built using open standards, absent dependence on specific platforms or software frameworks. In addition, the components of the Stack should be loosely coupled using open interfaces (APIs).⁸ Adoption of open APIs and open standards and, where prudent, choosing open source frameworks and components over proprietary ones, creating vendor-neutral API's, will help achieve the goal of interoperability.

4.

Privacy and Security by Design

Managing security and privacy of data is important in healthcare technology and thus will be a critical part of the design of the Stack. All data access must be through API calls to ensure centralised management of security controls. Direct access will be prohibited for internal modules and use of APIs will be mandated. NHS will ensure privacy and data integrity and will disseminate data to authenticated and authorised stakeholders only (both internal and external). Sensitive health data about individuals will be encrypted at rest. Mechanisms for user consent, using the MeitY Electronic Consent Framework,⁹ will be implemented to enable applications to share data about users in a safe manner. Finally, tools to enable audit and breach investigations will be present.

⁸ Reference to MeitY Open API Policy 2015 (<http://meity.gov.in/content/policy-open-application-programming-interfaces-government-india>)

⁹ Reference to MeitY Electronic Consent Framework (<http://dla.gov.in/sites/default/files/pdf/MeitY-Consent-Tech-Framework%20v1.1.pdf>)

5.

Strong Data Governance

NHS will follow principles of strong data governance. Data about any individual (patient, doctor, etc) in the system must be under the control of that individual, using the MeitY Electronic Consent Framework,¹⁰ and any entity holding that data must first obtain legitimate consent from that individual before sharing the data or processing it in other ways. Strong mechanisms for anonymization must be in place to enable data to be efficiently aggregated and analyzed for purposes where aggregate data is desirable (e.g. fraud detection, medical research).

6.

Ensuring Extensibility through the use of Layered Design

The design of NHS will be modular: there will be a clear separation of concerns for data storage, software services

and APIs. Components will be minimalistic and independently replaceable and extensible. This will allow different components to be loosely coupled when building applications which will enable application diversity. State governments will be able to customise at a sub-stack level and create contextual solutions to serve their specific purpose, make changes to them with appropriate permission control and audit trace.

7.

Granular Control

The modular design of NHS will enable governments (both center and state) to configure it easily and to use its components depending on their needs. A configurable plug-n-play model will also ensure simplicity and governments will be able to implement their own applications rapidly, allowing the Stack to scale nationally with ease.

8.

Designing for Evolvability and Scale

The Stack must be able to scale horizontally to hundreds of millions of users in the healthcare ecosystem and to handle trillions of data records. All components including computer, network and storage resources must be capable of scaling horizontally: it should be possible to add new resources as and when needed to achieve required scale. Being cloud-ready and using commodity hardware will ensure that capital investments on the Stack will be minimal. This will also give a choice of infrastructure to the implementers and enable systems to evolve heterogeneously. Finally, the scale of use of the Stack should be measurable and demonstrable.

¹⁰ Reference to MeitY Electronic Consent Framework (<http://dla.gov.in/sites/default/files/pdf/MeitY-Consent-Tech-Framework%20v1.1.pdf>)

9.
Based on Common Open-Source to create Public Goods

NHS will be built using available open-source frameworks. This approach will ensure full flexibility in feature enhancements, give full code control to program implementers, avoid vendor lock-in, and allow any third party to build solutions on top of the platform. These features, in turn, will help ensure agility of the Stack and its applications, build trust among consumers and enable scalability.

10.
Transparency and Accountability through Data

The verified registry of all the entities and the non-repudiable transaction trails shall lead to higher trust and stronger accountability. NHS will be data-driven and will use data generated through transactions for reporting and analysis. Public Open Data shall be made available via APIs for transparency. The access to open data will ensure high-quality analytics, accurate fraud detection, shorter cycles for system improvement (e.g., updates to health policies can be made efficiently) and, most importantly, high responsiveness to user needs.

Benefits of the National Health Stack

There are numerous benefits to this approach—expected to accrue to individual beneficiaries, the central and state governments, the private sector; nudge healthcare service and insurance providers towards efficiency and accountability. These are outlined below.

BENEFITS TO PUBLIC

The greatest impact of the National Health Stack on the lives of people in the country will be, for the first time ever, the shift towards Citizen and Wellness Centric policy making.

As NHS matures with data over time, it will be well equipped to deliver solutions (in phases) to the four big challenges of healthcare faced by the people of India—availability, accessibility, affordability and acceptability.

Phase 1—Improving Affordability

Technology in Healthcare will provide affordability.

Increased participation of service providers and availability of healthcare services due to justified pricing, instant adjudication and On Time payment of claims will result in more widespread cashless care. This will result in significant improvement in:

- Financial protection (reduced out-of-pocket payments)
- Improved overall health and reduction of wage loss through individuals seeking more preventative care, and accessing medical assistance in earlier stages of illness

Over time as data is collated on the platform and a modern schema-less federated PHR is adopted, we foresee doing away with the need to conduct unnecessary tests as all records will be linked.

Phase 2—Improving Accessibility & Availability

National Health Stack will:

- Allow beneficiaries to avail the policy at any point in time of the year

- Increase access and availability of service providers for the beneficiaries through the **Faster Adjudication of claims feature** for service providers, making the program more attractive to them
- Incentivize service providers, via a scorecard mechanism, to set up facilities closer to the beneficiaries (e.g. tier 3 towns)—thus empowering the beneficiaries with choice

Instant adjudication, payment and claims closure will incentivise the service providers to participate in government-financed health insurance schemes with tremendous energy—increasing access and availability of service providers for the beneficiaries.

Phase 3—Improve Acceptability

A Value-based Purchasing feature can now be introduced as the Stack collates enough data to initiate a reward-based program based on incentivized payments and public reporting for the quality of care they give to patients, productivity and cost control.

The Hospital Value-based Purchasing Program encourages hospitals to improve the quality and safety of acute inpatient care for health protection beneficiaries and all patients by:

- Eliminating or reducing adverse events (healthcare errors resulting in patient harm)
- Adopting evidence-based care standards and protocols that make the best outcomes for the most patients
- Changing hospital processes to make patients' care experiences better
- Increasing care transparency for consumers
- Recognizing hospitals that give high-quality care at a lower cost to government-funded healthcare program beneficiaries

BENEFITS TO THE CENTRAL GOVERNMENT

India's is a federal government and health is a state subject. The National Health Stack will allow the Government of India to:

- Build in the feature of **Portability** for migrants, thus allowing it to fulfil its promise of healthcare and health protection anywhere in the country
- Achieve portability not just for the beneficiaries but also for practitioners

- Potentially place India at the forefront of medical research in the world. The design is geared to generate vast amounts of data resulting in some of the largest health databases with secured anonymised aggregated data
- Get a holistic view across health verticals through integrated national dashboards
- Adopt data-driven policy making through real-time reports and analytics
- Reduce the cost of healthcare through improved fraud detection, and
- Enable effective management of schemes and mission to achieve the goals of NHM

BENEFITS TO THE STATES

The National Health Stack will allow States to:

- Incorporate horizontal and vertical expansion of scheme and facilitate co-branding
- Leverage RSSM funds yet configure and customize based on their needs (items like eligibility, coverage of procedures etc), as well as maintain control over data.
- Avoid duplication of efforts and enable ease of adoption for those without systems or with dysfunctional systems in place
- Continue using their own state system while integrating with RSSM via APIs, making migration simple in case of states with more advanced systems.

Well-functioning and Accountable Private Sector Participation

SERVICE PROVIDERS

The core intent of the National Health Stack is to enable **On Time Payments** for the Service Providers. The technology stack will enable the distinction between good and bad service providers, as dictated by data, and subsequent recognition/treatment to create a self-sustaining win-win ecosystem in healthcare where better service providers will bubble to the top.

- **Digitization of policies, user registries, provider registries** will standardize empanelment, pre-authorization, claims processes and streamline operations resulting in administration ease for those participating in multiple government-financed health protection schemes
- **Combination of Instant Adjudication and Fraud Detection** tools will ensure the service provider is rewarded immediately for making honest claims and has no incentives to make fraudulent claims
- **Analytics** on data reported by service providers on actual cost for a procedure will result in establishing scientific packages and pricing of procedures

HEALTH INSURANCE PROVIDERS

Historically, insurance providers have been plagued with adverse incentives to reduce the claims ratio and avoid enrolling vulnerable, high risk populations which tend to have the greatest need for health protection.

The National Health Stack will benefit insurance providers while simultaneously bringing in efficiencies and enforcing accountability through:

- **A dramatic reduction in fraud** due to network scale data collated as a result of shared digital infrastructure
- **Reduced cost of operations**, as most processes will be streamlined on the claims engine
- **Access to data on performance of service providers** to help fine tune their sourcing mix
- **Reduction in claims ratio**, as the whole ecosystem will work towards management of health rather than management of disease
- **Market expansion and targeted product offering** with availability of supply side data

Conclusion

In India, 6 Cr individuals move Below the Poverty Line (BPL) every year because of expenses related to unforeseen illnesses, placing substantial constraints on the individual welfare and the nation's economic growth. Our Out-of-Pocket Expense rate stands currently at 70%, while the government's health budget is a mere 1.3% of its GDP (which remains largely unspent). Providing health coverage to the more vulnerable sections of society is a large and complex problem which needs to be tackled on a war footing. With Ayushman Bharat, the Government of India has indicated its desire to take healthcare protection to a new aspirational level.

The most critical lever in the ecosystem which can bring about a shift is the Service Provider. Participation of the currently disillusioned service provider in turn can be secured only through timely payments. This requires auto-adjudication of pre-authorizations and claims possible through world-class fraud detection system and hence the need for a claims engine.

Past experience and success with UPI, GSTN and other national platforms suggests that a platform approach could benefit the healthcare sector in improving the process flows for service providers. With building blocks in the form of policy repositories and various national level registries, workflows and PHR, incentivised access to stakeholders through open APIs, and consolidation of all insurance and assurance claims for health care at all levels (primary and preventive, secondary and tertiary) through a Claims Engine, the quality and accessibility of care could be dramatically improved.

We believe that this modular and open-source design will help cater to the current and growing needs of over a billion people and navigate the complexities of governance structures, multiple health systems and a combination of public and private providers. The concept of National Health Stack will significantly accelerate the participation of various stakeholders of the healthcare ecosystem and ensure deployment of patient-centric policies—resulting in **Cashless Care with Improved Access** to ensure protection for the poor.

Given its federal structure and limited resources, India demands agility, flexibility and evidence based smart policy making for implementation of healthcare initiatives, driving all stakeholders towards **health-seeking behaviours** with renewed energy. The adoption of the National Health Stack will provide a stimulus not only to act in conformity with a globally progressive commitment to health equity, but also enable India to become a leader of the movement by creating one of the best contemporary technology-informed models for universal health coverage.



NITI Aayog

National Institute for
Transforming India

Government of India

Nirman Bhawan, New Delhi
Dated August 30, 2018.

Office Memorandum

Subject: National Health Stack (NHS) document approach paper for Pradhan Mantri Rashtriya Swasthya Suraksha Mission (PM RSSM) - reg.

The undersigned is directed to refer to the D.O. letter No. 3(4) 2018-H&FW dated 13th July 2018, addressed to the Economic Adviser, Ministry of Housing and Urban Affairs, regarding the above subject and to convey the following observations in the context of the Socio Economic Caste Census (SECC)-2011, which forms the basis of identification of prospective beneficiaries under PM RSSM:

- i. Updation of SECC-2011 data would be necessitated simultaneously for rural and urban areas to enhance the effectiveness and credibility of this database. In this regard, a Committee was constituted by the Department of Rural Development to examine the relevant issues.
- ii. Moving forward from a one-time baseline survey to updating the information on a continuous basis, however, the focus should be on the entire universe of residents/citizens rather than splitting them into rural and urban population.
- iii. During SECC-2011, enumeration was done at the place where a person is ordinarily resident. Given occupational mobility, however, a person enumerated in rural area may be a prospective beneficiary in urban area or vice-versa. Maintaining urban and rural population as two distinct and disparate databases would restrict the verification of beneficiaries within specific database, which may constrain proper identification.
- iv. The entire SECC-2011 data base is electronic and unique identifiers at household and individual level may facilitate the establishment of seamless linkage across multiple data bases, feasibility of which may be explored during the creation of the National Health Stack.

2. This issues with the approval of competent authority.

me 4) / 4P (Abhisat) ✓
29/8
To
Shri Alok Kumar, I.A.S
Adviser
NITI Aayog
Parliament Street
New Delhi - 110 001

(Umraw Singh)
Director(NBO)
Tel: 23061683
email: umraw.s@gov.in



Health stack NITI <healthstackniti@gmail.com>

National Health Stack - Inputs for Next Steps

1 message

divyaraj <divyaraj@iiitb.ac.in>
To: healthstackniti@gmail.com

Mon, Aug 27, 2018 at 10:04 PM

To,

The NITI Aayog, Govt of India.

Reference: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=180450>

Hi,

I am attaching my inputs for the next steps with respect to National Health Stack as envisioned by NITI Aayog in the "NHS-Strategy-and-Approach-Document-for-consultation" document published in July '18.

Will be happy to deliberate further or provide any clarifications needed.

Thanks and regards,

Divya Raj

Principal Technology Strategist and Adjunct Faculty | E-Health Research Center | IIIT-B | Electronic City Phase 1, Hosur Road, Bangalore | Cell: +91 973 945 2244



National Health Stack - Inputs for Next Steps.pdf
574K

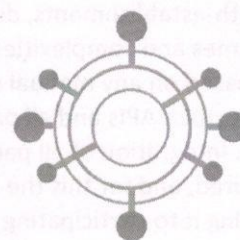
National Health Stack – Inputs for Next Steps

Extraordinary problems need extraordinary solutions. And creating a country level IT infrastructure addressing challenges in India's Healthcare management for its 1.3 billion population definitely falls very well into that category.

NITI Aayog's "National Health Stack - Strategy and Approach" document published in July '18 is a good starting point in the direction of digitizing India's healthcare management for meeting the challenge of healthcare of India's masses, a clear reflection of the realization that India's Healthcare needs a digital infrastructure. The National Health Stack (NHS) is outlined as a "visionary digital framework" with four key components -- electronic health registries of health service providers and beneficiaries, a coverage and claims platform, a federated personal health records framework and a national health analytics platform.

However at the same time there are some gaps and untouched aspects which must be taken care sooner than later to avoid putting up this huge infrastructure with a misalignment or with a flawed foundation. Ironically, while the document as well clearly recognizes that Ayushman Bharat has a 2 pronged strategy -- setting up of 1.5 L Wellness Centers in Primary Healthcare and increasing the financial protection for secondary and tertiary care -- the former strategy component has been largely left out of deliberations in this very document. There can be no two thoughts about the high criticality of the Primary Healthcare system in India's healthcare. NHS implementations designed with primary focus on insurance claims and coverage will be a lopsided strategy for the scale of efforts involved. In fact, extending this further beyond the Wellness Centers, the NHS must plan to give adequate provisioning for the ASHA and other grassroots level Health-workers who are working most closely with the masses and form the lowest layer of healthcare services hierarchy which is extremely critical for preventive and primary healthcare. Any digitization initiative leaving these grassroots workers out of purview would be stunted and ineffective. Options should be explored to address any gaps currently existing in this extremely critical layer.

Coming to the technical aspects of the NHS stack it is important to understand that in our highly democratic and federal setup it may be justified for NITI Aayog to restrict their guidelines only till technical stack level. However leaving the next line of details totally to various public and private stakeholders will likely lead to anarchic and incompatible solution outcomes across the country. It is imperative that NITI Ayog comes up with next level of guidelines and pushes the states and all stakeholders to align to those guidelines. Without going into the modalities of the way it will be done, the rest of this article will focus on some of the key design considerations which must be included by various implementers for ensuring there is basic hygiene and consistency in this National registry of this scale.



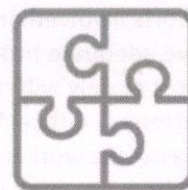
Envisioning National Health Electronic Registry as a national one, as "a single source of truth for and manage master health data of the nation" sounds very ambitious. Rather than letting this happen at the "democratic" pace, this needs to be executed with greater authority, careful planning and a best-in-breed technology platform. At the same time we must also look at the ROI of this grand registry or repository -- do we really see a significant proportion of patients moving across states for health treatments? Instead of trying to build a mammoth data repository a more practical and effective approach may be to maintain the repositories at state-level for now, provisioning the

central registry to have only meta-data for querying and pulling information from the state health repositories.

Maintaining Unique Identity of Patients at National Level: A mechanism of Unique identification of patients across various systems and networks will have to be ensured while giving due regard to all the various Government approved Identity mechanisms and not just Aadhar. This is to ensure that the treatment cannot be delayed or denied for lack of Aadhar or any other identity mechanism. At the same time there needs to be a robust mechanism for ensuring there is no Data duplication or Data redundancy.

EHR Standard: While the document does talk about EHR and Open APIs, it does not talk about a specific standard to be adopted. While guidelines on EHR and Open APIs will help ensure compatibility, it may be a good idea to recommend specific APIs or standards to be followed by doing evaluation of options centrally rather than leaving it to plethora of vendors and stakeholders. OpenEHR, which is an open standard specification in health informatics describing management and storage, retrieval and exchange of health data in EHRs, can be a good option to evaluate for fitment. With good adoption in Europe, Australia and now in US too it definitely looks like a potential standard to align with.

Data Privacy and Data Security: Vision of having a centralized registry of health data for 130 billion people entails a huge challenge in terms of ensuring the data is secure, only authorised and appropriate data is accessible to stakeholders and the data cannot be misused by technical or non-technical individuals, agencies, organizations or negative forces. This requires very strong and explicit guidelines to be provided to all the implementers at different levels because any gaps and nuisances with respect to data security and data privacy can have cascading effect and has tremendous detrimental potentials on this mega initiative.



Integration: The Health Registry will be the central registry for all Health establishments, professionals, patients, health workers, medical personnel and other stakeholders. And it will be closely integrated with the Health data repository which should have all the data or meta-data for all patients, their visits to all different health-establishments, diagnosis, scans, test-reports and treatments. Considering the scales, volumes and complexities it is obvious that a digital platform connecting all these cannot afford to be based on any manual data updates. All the different applications will have to be well-integrated using open APIs and all participating applications need to be mandated to expose APIs in a standard way. Integration of all participating applications in a seamless and real-time basis will have to be ensured, and for this the standard API formats and protocols need to be laid out clearly rather than leaving it to participating organizations and stakeholders.

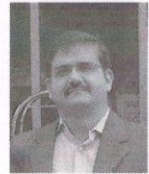
User Experience and Design Thinking: The Industry has realized the importance of User Experience (UX) and Design Thinking for success of IT initiatives. Its high time that the Government and NITI Aayog realize the importance of these for a platform of this scale. Its crucial that all the personas are thoroughly identified and are given due consideration when designing the application including the user interfaces, the flows and the processes. While Ayushman Bharat and settlement of Insurance claims might be the primary driving factors for NHS platform it will be important to give due consideration to personas covering the doctors, patients, ASHA and other Health-workers. Our focus should not be limited to just hospitals, insurance firms and administration.

NITI Aayog has done a commendable work in envisioning the National Health Stack which will push the digitization initiative in India's Healthcare in a big way, paving the way for numerous benefits to

the masses including the financial protection and also other benefits including policy making, governance, healthcare research etc. In doing this NIT Aayog have set the bar high for themselves. It will be great to see this being further followed up with detailed solution architecture and design guidelines for National or State Health IT Platforms, or possibly even the solution architecture itself, incorporating the inputs highlighted here among all other considerations.

About the Author:

The author, Mr. Divya Raj, is Principal Technology Strategist at E-Health Research Center of International Institute of Information Technology, Bangalore where he is also an adjunct faculty. He comes with around 2 decades of IT industry experience with a specialization in Enterprise Integration and Artificial Intelligence technologies. The opinions expressed in this document are in his personal capacity.





Health stack NITI <healthstackniti@gmail.com>

Re: Microsave: Creation of National Health Stack

1 message

Venkat Goli <venkat.goli@microsave.net>

Fri, Aug 10, 2018 at 2:49 PM

To: healthstackniti@gmail.com

Cc: alokkumar.up@nic.in, Akshat.Mandloi@gov.in, Akshat Mandloi <Akshat.mandloi649@gmail.com>

Dear Sir,

Thank you for once again providing us the opportunity to work with you on the National Health Stack. Please find our comments for the Strategy and Approach on the National Health Stack that you had released for

I do look forward to interacting with the team in person to discuss and share our views.

Warm Regards

Venkat Goli

+91 9873 148 289

On Tue, Jul 31, 2018 at 2:16 PM, Venkat Goli <venkat.goli@microsave.net> wrote:

Dear NITI Health Stack Team,

Greetings from Microsave ! We are an international financial inclusion consulting firm that works to strengthen the capacity of institutions to deliver market-led, actionable, on-site operational assistance. We are already working with NITI on the Aspirational Districts Programme and on DBT in Fertilizers Assessment.

We are in receipt of the Consultation paper on the National Health Stack and are working towards providing our comments. As we would like to perform a comprehensive review and augment it with our own research we request if you could further extend the last date of submission to 10th of August.

Warm Rgds

Venkat Goli

+91 9873 148 289

**Microsave_National Health Stack v2.pdf**

428K

A photograph of a woman wearing a white sari, looking down at a smartphone held in her hands. The phone screen displays a list of items, possibly a shopping list or a menu. The background is slightly blurred, showing what appears to be a shop or a market setting.

National Health Stack (NHS) Strategy and approach

Microsave's Response to Comments Invited for
Creation of National Health Stack

Venkat G
venkat.goli@microsave.net
M: +91 9873 148 289

MicroSave
Marketed solutions for financial services

Key Recommendations

Appropriate Legislation that mandates the adoption of the National Health Stack among all stakeholders will be a Critical Success Factor

NHS should leverage existing Standards and Platforms that have already been/being adopted in India

Mandate interoperable Cloud Technology standards for all stakeholders in the NHS ecosystem to avoid incompatible cloud offerings based on proprietary architectures

Strive for an end-to-end Near-Real Time Digitisation of the Patient Journey to ensure a critical mass of data that is "error-free" and provides a "single source of truth"

Leverage existing standards released for Electronic Health Records (EHRs)

- In September 2013, the Ministry of Health & Family Welfare (MoH&FW) notified EHR standards for India. These were further revised in December 2016 in line with contemporary developments
- EHR provides standardisation, homogeneity and inter-operability in capture, storage, transmission & use of healthcare information. EHR should be mandated for all NHS stakeholders including PHCs for OPDs, SHC/THCs for IP, Pharmacies, Laboratories & Insurance Payors

Complement MoHFW's initiative of an Integrated Health Information Platform (IHIP)

- Integrated Health Information Platform (IHIP) is already being envisaged by MoHFW and is set to be rolled out in 2019
- The Centre for Health Informatics under MoH&FW has awarded the building of this platform to a consortium of IMS/Persistent Systems

Leverage existing India Stack Platform for Authentication, Consent and Payment

- Leverage Aadhaar based Authentication, DEPA based Consent and IMPS/UPI based electronic Payment
- The Patient-ID envisaged for each Patient can be a Virtual ID based on the existing Aadhaar ID

Legal backing for the adoption of NHS on the lines of Aadhaar

- NHS should be backed by an Act in the lines of Aadhaar with the creation of an NHS Authority
- The act should empower the NHS Authority to appoint Registrar(s) for the purpose of enrolling beneficiaries, providers and other stakeholders of the Healthcare ecosystem under this Act
- The Act should mandate the adoption of NHS to deliver efficient, transparent, and targeted Healthcare services to individuals residing in India

Ensure legislation for Digital Security of confidential Healthcare Information

- The Digital Information Security in Healthcare Act is being envisaged to standardize and regulate processes related to collection, storing, transmission and use of digital health data
- The Act should ensure reliability, data privacy, confidentiality and security of digital health data

Recommendation - 3: Interoperable Federated Cloud Platform

Interoperability is a Critical Success Factor for a federated NHS hosted across multiple Cloud Infrastructures

- Mandate interoperable Cloud Technology standards that avoid incompatible cloud offerings based on proprietary architectures
- The interoperable federated cloud architecture should facilitate seamless exchange of information between all stakeholders at the state and national level
- The need for an orchestration layer through a Cloud Broker may also be considered to ensure interoperability. The custodian for this layer should vest with the NHS Authority

Integrate across Service Models (IaaS vs PaaS vs SaaS) and consider opportunities and risks of various Deployment Models (Public vs Private vs Community Cloud)

- Various Stakeholders could use various service models such as IaaS, PaaS or SaaS. While the NHS should be agnostic of the Service Model; interoperability should allow data exchange between these cloud service Models
- Taking Privacy and Security into account an appropriate Cloud Deployment such as Public, Private or Community Cloud may be adopted for various components of the NHS stack

End to End Near Real Time Digitisation of the Patient Journey

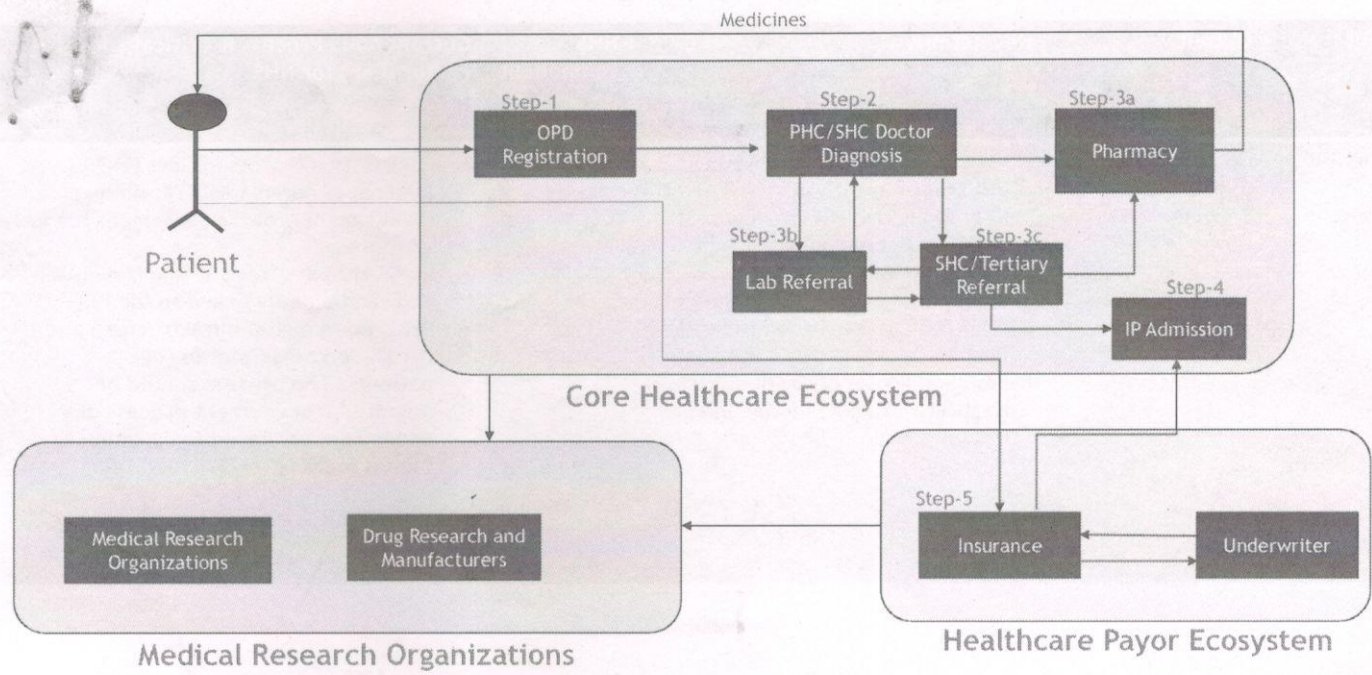
- A Critical Success factor for the National Health Stack is to have digitization at near real time throughout-out the Patient Journey by all stake-holders.
- This requires the requisite Digital infrastructure at various levels and skilled Digital Operators to achieve the goal

Data in the NHS must be "error-free", a "single source of truth" and should support Non-repudiation

- Digitization should take place at the location/within the premise of the service being availed to ensure optimization of digitization effort, reduction of errors
- Data Security and decentralisation of data may further require a Distributed Ledger Technology like block-chain to meet non-repudiation requirements of sensitive data

The following slides contain a Typical Patient journey and the Critical Success Factors for NHS to consider in the Patient's journey

Patient Journey Workflow: Abstracted AS-IS Process



Patient Journey Workflow and Applicability of National Health Stack

Process	Input	Output	Key Actions	NHS component	Current AS-IS Process & Critical Success Factor (CSF) for NHS
Step - 1	Patient ID, eKYC, eConsent	Doctor Appointment Triaging, PHR Download	• Patient Registers at OPD Desk at PHC/Hospital with Unique Patient ID or Biometric eKYC / eConsent • Based on initial complaint registered auto-triaging to appropriate Doctor. In the case of PHCs Patient is assigned to On-duty Doctor • Based on consent provided, Patient Health record gets downloaded at local hospital	PHR, HIS	• Registration Process in Govt PHCs is minimal or non-existent. Primary Challenge of Crowd Management is a key issue • In Pvt Hospitals registration is digitised and can be easily linked to the PHR • PHCs need digital infrastructure and ICT skilled personnel to register patients. The process should be migrated from current process of paper/register based registration to Digital registration Process

patient journey workflow and Applicability of National Health Stack

Process	Input	Output	Key Actions	NHS component	Current AS-IS Process & Critical Success Factor (CSF) for NHS
Step 2	Patient Complaint	Patient Diagnosis	• Patient lists out the complaint to the Doctor • Doctor provides a Diagnosis that could be: • Medicines that need to be taken along with Dosage • Referral to a lab to perform more tests • Referral to a Secondary/Tertiary Health Centre to a more competent Doctor	PHR, HIS	• In PHCs no Digitisation of the Doctor's diagnosis is done. Everything is recorded in the physical prescription form • In Private Hospitals/ SHCs /THCs Digitisation is done in two ways: • During the Diagnosis process the Doctor records observations and a Data Entry operator enters this information into a System in real-time • After the Diagnosis is done the Patient needs to go to another desk to have the diagnosis/prescription scanned • Digitisation of Diagnosis is a huge CSF for success of NHS as this allows for the rest of the building blocks such as pharmacy Systems etc to leverage on NHS • Doctors need to digitally sign the diagnosis for non-repudiation. Doctors need to be made aware of the benefits of sharing this information in anonymised form and be protected from charges of malpractice/lawsuits

Patient Journey Workflow and Applicability of National Health Stack

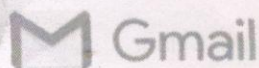
Process	Input	Output	Key Actions	NHS component	Current AS-IS Process & Critical Success Factor (CSF) for NHS
Step-3a	Doctor Prescription, Patient Diagnosis	Medicines	Pharmacy gives out Medicines to the Patient based on Digitally signed prescription /Diagnosis after digitally validating the patient	PHR, HIS	- Currently Pharmacies do not have the back-bone technology such as biometric authentication, Inventory Management Systems to validate a patient or to digitally receive a prescription - Diversion of Medicines can be controlled of an end to end if Pharmacies are integrated into the NHS network through an e-pharmacy component
Step-3b	Doctor Lab Referral, Patient diagnosis	Lab Reports / Tests	Lab will perform tests prescribed based on Digitally signed prescription /Diagnosis after digitally validating the patient	PHR, HIS	- Currently Labs do not have the back-bone technology such as biometric authentication to validate a patient or to digitally receive a Lab referral - Diversion of Medicines can be controlled of an end to end if Pharmacies are integrated into the NHS network through an e-pharmacy component

Patient Journey Workflow and Applicability of National Health Stack

Process	Input	Output	Key Actions	NHS component	Current AS-IS Process & Critical Success Factor (CSF) for NHS
Step-3c	Doctor Referral, Patient diagnosis	Patient Diagnosis, Admission	Referral to Secondary/Tertiary Health Centre for In-Patient (IP) admission where the following can be done: - Medicines that need to be taken along with Dosage (Step-3a) - Referral to a lab to perform more tests (Step-3b) - Admit as an In-patient(Step-4)	PHR, HIS	Refer points made in Step-2
Step-4	Doctor Referral, Patient diagnosis	Hospital Admission (In-patient)	Doctor at SHC/Tertiary Health care Centre admits the Patient for Care. This could include surgery or other treatments as per the diagnosis	PHR, HIS	This could comparatively be the most easy for digitisation/integration into the National Health Stack owing to advancement in computerization. However, back-bone infrastructure for Digital Authentication with Aadhaar and other systems may still need to be deployed
Step-5	Hospital Admission (In-patient), Patient ID/eKYC/eConsent	Insurance Pay-out	Cashless or reimbursement based	PHR, HIS, Claims Platform	Reimbursement or Cashless process will be a relatively low hanging fruit for digitisation owing to maturity of digital process currently

MicroSave

Market-led solutions for financial services



Health stack NITI <healthstackniti@gmail.com>

Re: National Health Stack- please share your feedback and comments

1 message

Digvijay Sandhu <digvijay.sandhu@accesssh.org>

Tue, Aug 7, 2018 at 3:31 PM

To: Nita Tyagi <nita@ispirit.in>, healthstackniti@gmail.com

Cc: Siddhartha Bhattacharya <siddhartha@accesssh.org>, Sofi Bergkvist <sofi.bergkvist@accesssh.org>, "Mr. Manu Kohli" <kohlimanu@gmail.com>, Maulik Chokshi <maulik.chokshi@accesssh.org>

Dear Nita,

We appreciate your understanding and value your acceptance.

Please find attached a document with comments on the National Health Stack. We hope that it adds to the merit of the document. We would love to hear back from you.

We will be in touch.

Warm Regards,

On Mon, Aug 6, 2018 at 9:23 AM, Nita Tyagi <nita@ispirit.in> wrote:

Thank you Digvijay.

Response from Access Health is highly valued.

Please go ahead and submit the response

Warm regards

Nita

On Sun, 5 Aug 2018 at 9:00 PM, Digvijay Sandhu <digvijay.sandhu@accesssh.org> wrote:

Dear Nita,

I hope everything is well at your end.

I must congratulate you on the National Health Stack document, it is very thoughtful and profound. In ACCESS Health, we were in process of submitting our responses, however, a few pending deadlines cramped our efforts.

I wish to inquire, is it still possible to submit the comments for the document? Please let me know.

Warm Regards,

On Sat, Aug 4, 2018 at 9:35 PM, Siddhartha Bhattacharya <siddhartha@accesssh.org> wrote:

Please check

On Sat, Aug 4, 2018 at 9:23 PM, Digvijay Sandhu <digvijay.sandhu@accesssh.org> wrote:

No Siddhartha, we did not. I wish we could. Is it still possible by any chance?

On Sat 4 Aug, 2018, 9:02 PM Siddhartha Bhattacharya, <siddhartha@accesssh.org> wrote:

Did we submit any comment? Thanks, Siddhartha

----- Forwarded message -----

From: **Nita Tyagi** <nita@ispirit.in>

Date: Wed, Jul 25, 2018 at 11:28 AM

Subject: National Health Stack- please share your feedback and comments

To: "Abhishek.Agrawal@milliman.com" <Abhishek.Agrawal@milliman.com>, Suhel Bidani <Suhel.Bidani@gatesfoundation.org>, "aggsalil@gmail.com" <aggsalil@gmail.com>, "ajay.mahal@unimelb.edu.au" <ajay.mahal@unimelb.edu.au>, "anukriti.chaudhari@gmail.com" <anukriti.chaudhari@gmail.com>, "anuradha.katyal@accessh.org" <anuradha.katyal@accessh.org>, "arvind.ranganathan01@gmail.com" <arvind.ranganathan01@gmail.com>, "asaxena@iiphg.org" <asaxena@iiphg.org>, "ashwani.aggarwal@pwc.com" <ashwani.aggarwal@pwc.com>, "balu@drishticare.org" <balu@drishticare.org>, "cbaezau@gmail.com" <cbaezau@gmail.com>, "chesta.sharma@pwc.com" <chesta.sharma@pwc.com>, "dash@iitm.ac.in" <dash@iitm.ac.in>, "dennis.streveler@gmail.com" <dennis.streveler@gmail.com>, "deva@iphindia.org" <deva@iphindia.org>, "digvijay.sandhu@accessh.org" <digvijay.sandhu@accessh.org>, "divleen.jeji@gmail.com" <divleen.jeji@gmail.com>, "drmanishayadav2014@gmail.com" <drmanishayadav2014@gmail.com>, "drpriyancka@gmail.com" <drpriyancka@gmail.com>, "imukhopadhyay@jgu.edu.in" <imukhopadhyay@jgu.edu.in>, "indrani@iegindia.org" <indrani@iegindia.org>, "indranil.jnu@gmail.com" <indranil.jnu@gmail.com>, "irshadcv70@gmail.com" <irshadcv70@gmail.com>, "jaidev.anand@accessh.org" <jaidev.anand@accessh.org>, "jlaforgia@acesoglobal.com" <jlaforgia@acesoglobal.com>, "kanch@tiss.edu" <kanch@tiss.edu>, "lalit.baveja@milliman.com" <lalit.baveja@milliman.com>, "mani@iitm.ac.in" <mani@iitm.ac.in>, "maulik.chokshi@accessh.org" <maulik.chokshi@accessh.org>, "mayank.kapur@gramener.com" <mayank.kapur@gramener.com>, "ndevadasan@gmail.com" <ndevadasan@gmail.com>, "nita@ispirt.in" <nita@ispirt.in>, "sarang_deo@isb.edu" <sarang_deo@isb.edu>, "sarit.kumar@phfi.org" <sarit.kumar@phfi.org>, "shirisha@zoho.com" <shirisha@zoho.com>, "siddhartha@accessh.org" <siddhartha@accessh.org>, "skg467@gmail.com" <skg467@gmail.com>, "sofi@accessh.org" <sofi@accessh.org>, "sukumarv@goa.bits-pilani.ac.in" <sukumarv@goa.bits-pilani.ac.in>, "sumita.chopra@gmail.com" <sumita.chopra@gmail.com>, "venkatfms@gmail.com" <venkatfms@gmail.com>, "venkbalaji65@gmail.com" <venkbalaji65@gmail.com>, "vrm@iitm.ac.in" <vrm@iitm.ac.in>

Dear All,

The approach paper for National health stack has been created, NitiAayog has invited comments from the public before 1st Aug 2018. Please review the paper and raise questions if you have

<http://pib.nic.in/newsite/PrintRelease.aspx?relid=180450>

Here is the link to the document-

http://niti.gov.in/writereaddata/files/document_publication/NHS-Strategy-and-Approach-Documents-for-consultation.pdf

Thanks and regards

Nita

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Digvijay Sandhu | Consultant
ACCESS Health International | New Delhi
Contact | +91 9555973513 | Skype: digvijayakadj
www.accessh.org

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Digvijay Sandhu | Consultant
ACCESS Health International | New Delhi
Contact | +91 9555973513 | Skype: digvijayakadj
www.accessh.org



Response to National Health Stack-ACCESS Health International.pdf
243K



ACCESS
health international

Our vision is that all people, no matter where they live, no matter what their age, have a right to access high quality, affordable healthcare

Response to the National Health Stack

General comments:

Consumer Empowerment

While the National Health Stack discusses about financiers and providers, it must ensure that consumers are also empowered with data. The data can enable consumers to make informed choices on their personal health, life style and providers. Ability to access relevant details like hospital acquired infection rates or readmission rates should be transparently made available and a layer of key consumer data charter should be integrated into the stack.

Fraud

The National Health Stack suggests that "When a fraud is reported, all pending claim settlements and any new claim settlements for a hospital are placed on hold until the fraud raised can be investigated." This can result in poor provider participation. It is better to penalize once fraud is confirmed. The potential fraud detected by the system can trigger different types of investigations and can have different timelines to investigate. In case there are delays in investigating, the providers should not be punished. There can be different approaches in dealing with fraud depending on what type of fraud is suspected. Most suspected frauds should not necessarily lead to holding off payments. Future deductions, once the fraud is confirmed, is a better way to penalize.

It is important that triggers that capture fraud evolve and are continually updated over time. As providers behaviors change, the triggers also need to change. The triggers may be specific for states given that certain types of fraud may be more common in some areas. It would be good to have a state specific team to design, test, and analyze effectiveness of triggers. The information on the used triggers should be stored in a National depository.

Performance-Based Payouts

Learning from the CMS (Centre for Medicare and Medicaid services) model in USA, we propose that the stack include performance-based payouts method. Procedure and treatment cost should be kept variable such that facilities are given incentives to increase their earnings based on differential performance.



ACCESS
health international

Our vision is that all people, no matter where they live, no matter what their age, have a right to access high quality, affordable healthcare

Quality Improvement

Quality of care is one of the main challenges in healthcare in India. The health stack should not only be able to improve fraud detection but also be able to drive improvements in quality of care. For example, providers should get notifications when they do not follow standard treatment guidelines. The system can also serve as decision support and remind patients and providers about required services. For example, reminders on medication needs and follow up visits. The stack can be further strengthened if it proposes measurement tools, improvement pathways, and incentive models to improve quality of care.

Standards

The National Health Stack refers to open APIs. That is good. We propose that international standards should also be used to the extent that it can. This will be important for the continuous improvement of systems and ability to integrate new global applications.



Health stack NITI <healthstackniti@gmail.com>

Comments on NHS from HIMSS APAC India Chapter

1 message

Ishaq Quadri <ishaqquadri@gmail.com>

Fri, Aug 3, 2018 at 11:45 PM

To: healthstackniti@gmail.com

Cc: Annie Mathew <mathew.anniepaul@gmail.com>, Jeyaseelan J <jeyaseelan.j@gmail.com>, Nitiraj Gandhi <nitiraj.gandhi@gmail.com>, Rohit Sharma <rohit.gem26@gmail.com>, "Dr. Vivek Sahi" <drhimss@outlook.com>, india.leaders@himsschapter.org

Dear Sir/Madam,

Greetings from HIMSS APAC India Chapter

At the outset we at HIMSS APAC India Chapter would like to express our deep sense of appreciation to NITI Aayog and Government of India for coming out with National Health Stack (NHS) as a technology approach and strategy document for the Ayushman Bharath scheme which is aimed at making healthcare accessible and affordable to the masses.

Please find attached a document having comments and views of HIMSS APAC India Chapter on the NHS document.

Do let us know if you need more details or clarity.

Thanks & Regards

Ishaq Quadri

Secretary,

HIMSS APAC India Chapter

About HIMSS

HIMSS (<http://www.himss.org>) is a global, cause-based, not-for-profit organization focused on better health through information technology (IT).

HIMSS lead efforts to optimize health engagements and healthcare outcomes using IT.

HIMSS APAC India Chapter was formed in 2010 and has the distinction of being the first country-specific chapter of HIMSS outside USA. The Chapter has been at the forefront in forming Industry opinion and thought leadership on Healthcare IT challenges. With the revamped Board and Committees the Chapter has broadened its base forging alliances with representation from IT Industry, Hospital CIOs and SMEs.

 **NHS-HIMSS-APAC-India-Chapter-Comments.pdf**
223K

Comments and Views from
HIMSS APAC India Chapter
on
“National Health Stack, Strategy and
Approach”, July 2018,
Published by NITI Ayog

Introduction

National Institute of Transforming India (NITI) Ayog, which is a Government of India Agency has come out with National Health Stack (NHS), a strategy and approach document containing technology guidelines towards building the digital infrastructure of Ayushman Bharath, the health scheme aimed at setting up 1.5 lakh Health and Wellness Centers across India and Health Insurance Scheme to cover 10 Crore families below poverty line. NITI Ayog has invited comments and consultation on this important document. Health Information Management Systems Society (HIMSS), a globally recognized not for profit organization working towards transforming healthcare through information technology, through its APAC India Chapter would like to appreciate NITI Ayog for coming out with a comprehensive document and hereby submit our comments and suggestions to further improve the same.

While we do have a view on the overall Ayushman Bharath initiative which is briefly mentioned in the beginning, the focus and scope of this document is restricted to the National Health Stack.

For questions or clarification please do not hesitate to contact us through our email id india.leaders@himsschapter.org

Comments and views on the concept note for the National Health Stack

Section	Comment
1. Executive Summary & National Health Stack (NHS Overview)	The section offers a brief yet succinct articulation of the goals, current Health IT context and therefore the reason why National Health Stack is required. Well done.
2. Introduction	This section deals with the background of the National Health Policy and Ayushman Bharath Yojna Although the focus of comments in the following sections is on Health Stack, the following are some high level views on the Ayushman Bharath Yojna: 1. It is suggested to deal with the family member as a separate entity or individual. Individuals therefore would get a coverage of 1 lac (the family members can transfer their coverage as and when required). This is to overcome one of the drawbacks in the PDS on the overall administrative overheads related to management of data and processes pertaining to families and family members. 2. Disease risk based stratifications and identifications need to be at source (similar to private insurance policies where diabetes, history of hypertension, cancer, etc. are identified prior to enrolment) 3. A sum of Rs 80,000/- per wellness center (1200 Crores for 1.5 lac Centers) per year looks highly unviable and hence may not be sustainable. This does not include manpower costs let alone systems and services rendered 4. One of the challenges with the existing schemes as mentioned on page 15 is related to poor participation by providers. From a technology perspective we need to dwell into their state of readiness and how they will adapt to the change will be detrimental to the success of this scheme.
3. NHS Overview	This section provides an overview of the various components of National Health Stack <u>Phased Manner of Implementation</u> National Health Stack (NHS), the technology foundational components of Ayushman Bharath is a massive initiative which would be extremely challenging to implement unless the priorities are clearly laid down in phases. A categorization on the basis of Base Components, Fully Functional Set and Advanced Set would help. The Phases mentioned on page 37 are basically pockets or grouping of benefits.
4. Electronic Registries and Approach and Considerations for	<u>National Health Registry</u> National Health Registries are expected to be the single source of truth for master data pertaining to various health-sector stakeholders.

designing
Electronic
Registries

This process would, over time, build and maintain a cross-reference index of all identifiers associated with each entity (e.g. Aadhaar, Jan Dhan, driver's license number, etc.), a history of all source records associated with the unique identifier and a history of all changes to entity master record and its corresponding source records.

Single Central Registry Vs Multiple Registries

- A single central person registry may not be optimal for the population of India. It may be advantageous to consider a 2-/3-level hierarchy of person registries, with central registry consolidating registrations from state-based registries and perhaps these consolidating registrations from smaller administrative divisions or groups of healthcare organisations.
- This model would permit lookup of person details across geographic and administrative boundaries while localising search and improving retrieval efficiency, and distributing maintenance burden amongst operators of registries.
- This is suggested on the basis that most patients will receive services in their local areas and only seek services elsewhere on relatively few occasions. [NHS Framework: Guiding Principle 2][NHS Overall Design: Principle 4][NHS Overall Design: Principle 3]
- Patient/Person/Doctor/Provider Registries are in production use as part of EHRs at national and regional level, and independently in hospital and hospital group contexts in many countries in the world including Australia, United States and elsewhere. Support for standards-compliance, vendor product compliance, availability of practical industry experience and international health systems' experience could be drawn upon for lessons learnt and best practices.

Security, Audit and Consent Management

- Sophisticated solutions typically incorporate appropriate security, audit and consent features. Solutions that provide registry functionality can ingest standards-compliant data objects such as HL7 v2 and HL7 v3 messages, providing the ability to integrate data from legacy systems, and typically offer a rich set of solution-specific APIs that utilise standards-based channel security, and standards-compliant authentication and authorisation mechanism. [NHS Framework: Guiding Principle 4][NHS Overall Design: Principle 4][NHS Overall Design: Principle 10]
- Principle 1 of NHS expects that "Patient is the Controller of her data" but the challenge would be managing the consent by unlettered or low/under educated BPL population of India
- Provision of this kind of control requires that patient identification (Patient/Consumer/Health ID Registry) and user identity management (Identity Management in traditional authentication and authorisation sense) are combined with provider identification (Doctor Registry, Provider Registry) and entitlements management (appropriately-grained "who is authorised access to what under what conditions" in the access control sense). [NHS Framework:

	Guiding Principle 1 and 3][NHS Overall Design: Principle 2][NHS Overall Design: Principle 4]
5. Coverage and Claims Platform	An end to end Coverage and Claims platform should include: <u>Component Based Approach and Interoperability</u> It is critical that the platform takes a component based approach to allow for heterogenous environments and interfaces depending on third party requirements such as health insurers or TPAs, medical researchers, auditors, policy makers etc. The interfaces to the components should support open standards such as REST and Web Services (SOAP) for complete interoperability and digitization. A common security model is also critical for these integration points to ensure that any interaction with third parties is properly authorised. <u>Security & Audit Capabilities</u> The coverage and claims platform includes sensitive PHI level information embedded in claims data. It is essential that the platform support best practices such as HIPAA, GDPR or equivalent to ensure that technical controls are adequate. These audit mechanisms need to be applied regardless of interfaces used (user interface or API) and often will also need to include the logging of view operations in addition to data modification. The platform should provide the ability to encrypt data at rest and in transit. The components within the platform should be capable of supporting a common identity provider across both user interface and API access so that security access can be centrally managed. <u>Extensibility Model</u> The extensibility model should be based on configuration which can be shared and governed between the policy administration (coverage) capability and claim engine capability. The extensibility approach should provide for flexibility/speed but also provide appropriate governance and controls so that data model changes between environments/instances of the components is controlled. Furthermore changes to the data model should be consistent across user interface and API integration points for maximum benefits. <u>Multi Jurisdiction Support</u> The ability to configure rules and settings by jurisdiction enables localisation of the platform while maintaining the efficiencies of a shared service. Rules should be configurable so that these can be applied holistically and also for a selected jurisdiction or provider network as needed. <u>Technological Innovation</u> Disruptive technologies such as block chain should be explored as a futuristic way of doing health care related transactions, including the ability to setup and recognize smart contracts, and make the claim process frictionless as possible. A proof of concept would be the best way forward in this direction to assess solution fitment before adoption.

6. Claims Engine	A modern high-performance claims engine has several required characteristics which all combined can deliver excellence in claims processing. These include: <u>Rules Based Approach</u> Claims pricing and adjudication requires the application of complex rules to correctly process a claim. These rule types can include provider network rules including agreed provider fee schedules, claim line pricing rules including consideration of episode or case level considerations, support for various claim line coding schemes such as DRG or ICD and benefit calculation including consideration of limits. These rules are in addition to fraud detection rules such as medical necessity or anomalies in claim patterns. <u>Alternate Reimbursement Models</u> As public and private health payers alike seek to control claims costs support for various reimbursement models is essential. Traditional fee for services models are now combined with alternate models such as capitation, bundled payments and shared savings. It is fundamental that the claims engine is aware of these different reimbursement models to provide long term flexibility but also reduce administrative and payment errors due to inconsistencies in claiming across the various models. <u>Straight Through Processing/EDI</u> It is critical that a claim engine can support various EDI formats including coding schemes that may be adopted over time. These coding schemes such as DRG, ICD and others often differ by claim type/modality and the system should have the flexibility to validate and process these as required. Straight through processing of claim line information is critical to ensure the necessary cost savings and efficiency with some health payers achieving 99% plus. The ability to support the rules required to support end to end claim processing is key along with flexibility in pend rules. <u>Scalability</u> Medical claims processing can be complex and requires the application of multiple groups of rules to validate claim information, run claim line pricing calculation, apply fraud detection and adjudicate the claim to determine benefits payable. It is critical that the claim engine is designed from the ground up for scalability including the use "in memory" approaches where possible. Claim processing across claim lines can include very large volumes of work and it is critical that these can be processed at speed.
7. Fraud Management Service	Fraud Management is fundamental to driving cost savings and the ability to configure the claims engine to conduct fraud checks "in process" and pre-payment is key. Fraud Management needs to include various types of real time checks including: • Plausibility – Is the claim/provider combination reasonable in the context of other claims made with the same time period (regardless of patient). These checks often identify service volumes and service codes for a provider which seem unreasonable. Example: A physiotherapist claiming more than 32 physiotherapy sessions per day

	• Medical Necessity – are the claims lines reasonable and necessary given the diagnosis/presenting illness. This class of checks can identify situations such as where prescribed drugs are not aligned to the condition or where the combination of medical procedures are not appropriate to the diagnosis. • Combination Claim Checks – checking for claims where the combination of claims is not valid. Examples could include fillings for patients that have previously claimed for dentures or claims for items which should have been included in a bundled package. • Patient Appropriateness – Is the claimed procedure appropriate for the patient age, gender or similar. • Provider rendering service for which he is not authorized • Claims not matching pre authorized limits It is important to note that many of the above fraud checks include the need to validate claims within the context of other claims made (either for the same patient or across patients). Leveraging smart analysis and reporting capabilities to analyze fraud patterns, healthcare provider utilization, healthcare provider benchmarking is key for sustainability of any health care system in the world.
8. Federated Personal Health Records Framework (PHR) and Interoperability	<u>Health ID</u> A good idea but people have multiple PAN, and Aadhar cards, as well as more than 1 mobile number, so how will the duplication of data be managed? <u>EHR Integration Mechanism Not Clear</u> PHR has been given attention with the patient consent and working of the fiduciary at the same time EHR is not adequately mentioned from an implementation stand point. It is suggested to leverage the current EHR standards, Minimum Data Set along with the setting of Health Information Exchanges which will be the building blocks for the PHR infrastructure. There needs to be a roadmap and governance structure with clear jurisdiction defined to oversee the adoption and regulation of EHR. <u>Integration Mechanism not adequately addressed</u> An initiative of this nature requires a lot of interconnection with a huge variety of systems. Also how do we plan to get the private sector on board with the variety of systems they have. Web based APIs are a good option as mentioned in the document but the structure of the content also need to be looked at. HL7 FHIR could be a good candidate. <u>IHE- Global standard for Health Information Exchange</u> • The "Integrating the Healthcare Enterprise" (IHE) is an industry body working on improving interoperability of health systems. IHE has created "interoperability profiles" which guide vendors in building interoperability into their products to minimise challenges faced by the need to integrate multiple healthcare applications.

Interoperability

- One of the major IHE interoperability areas is the Cross-enterprise Document Sharing (XDS). IHE XDS addresses the requirements of federating clinical document repositories for the purpose of providing secure, standards-compliant access to clinical documents that supports repository models ranging from centralised to massively distributed. [NHS Framework: Guiding Principle 2][NHS Overall Design: Principle 4][NHS Overall Design: Principle 3]
- Electronic Health Records Systems that use IHE XDS-compliant Registries and Repositories are in production use in a number of EHRs at national and regional level in many countries in the world including Australia, United States and elsewhere.

Federated Health Data Repository

- It is suggested that IHE XDS approach to federating health record repositories and standardising submission and retrieval of health records will provide immediate advantages for the Federated Personal Health Records Framework in terms of support for standards-compliance, vendor product compliance, availability of industry and international health systems' experience that could be drawn upon for lessons learnt and best practices.

Open API

- IHE XDS standardised APIs would be used by clinical document providers and consumers to interact with the document Registries and Repositories. These APIs would be registered and managed via centralised API Gateway as they are or can be encapsulated with APIs wrappers which themselves would be registered with and managed via a centralised API Gateway if required. [NHS Framework: Guiding Principle 6][NHS Overall Design: Principle 2]

Security and Consent Management

- IHE XDS incorporates security features, audit features and consent features. IHE XDS can ingest structured objects (CDA, CCD) and unstructured objects (PDF, image, text, etc.), providing the ability to integrate clinical data from legacy systems as well as from modern systems which support CDA Level 2 and CCD documents. [NHS Framework: Guiding Principle 4][NHS Overall Design: Principle 4][NHS Overall Design: Principle 10]

Patient controlled Electronic Health Record

- Principle 1 of NHS expects that "Patient is the Controller of her data" but the challenge would be managing the consent by unlettered or low/under educated BPL population of India
- Secure audit trail stores, and security auditing and audit management tools and technologies would provide the means to undertake security-related investigations and other activities aimed at enhancing robustness of security provisions on the PHR. [NHS Overall Design: Principle 4]

	<u>Better Clinical Outcomes</u> In order to ensure clinical outcome measurement, Clinical guidelines and protocols must be followed as per evidence based medicine, which means that providers (Read Doctors) will need to follow them carefully, we need to have a mechanism to ensure that it really happens.
9. National Health Analytics Platform	The National Health Analytics Platform as described in the document is a quite high level and generic in nature but we are sure will have more clarity as we move along. It is also expected to over time incorporate new and emerging technologies and solutions that will include the Big Data and related analytical tooling and methodologies. The National Health Analytics platform should have following key capabilities: - Extraction and Accumulation of health Data which would be humungous in size and volume - Stream Analytics for real-time event processing both for fraud detection and for health status monitoring, anomaly detection and alerting, epidemiology, and real-time health enterprise and national health status review. - The business intelligence components of the platform will support both reporting and analytic output formats for traditional monitors as well as mobile device form factors, with attractive and easy to use interfaces. - It is expected that availability of large bodies of data collected throughout the country and deposited in traditional structured and unstructured Big Data stores will facilitate development and training of machine learning models, their refinement and deployment for automation and reduction of human errors, as well as trend and causation discovery, predictive analysis and enterprise-grade reporting and visualisations. - Depending on the requirement and the detail of data to be analysed it may be necessary to provide sensitive person data in identifiable or in de-identified form, and perhaps to provide secure means of re-identifying specific patients if data analysis suggest that clinical intervention is required. The Patient/Consumer/Health ID Registry can provide this capability and work in conjunction with the analytics platform as the source of de-identified patient data.
10. Others	- Security: Although there is a mention about Privacy and Security in the guiding principles section on page 34, it needs to be more firmed up from cyber security framework and compliance perspective. Share as well as unshare feature for patients is a must for better privacy - Training: Although it states that implementation is out of scope for this document – how does NITI Ayog propose to train clinical staff for data entry into the EMRs? Training is an important aspect of the whole implementation and therefore needs due attention

- **Quality:** Accreditations, quality have not been addressed. This framework should address these issues through sharing of anonymized data across the identified providers.
- **Change management:** This is going to be a big change for all stakeholders involved, there is no mention anywhere on how they propose to plan and conduct change management. All the important stakeholders (Government, Providers/Payers, Information Technology Vendors and Public) roles and responsibilities need to be clearly mentioned.
- **Existing Schemes:** It is recommended to leverage and extend the existing programs which are doing fairly well for example Mother and Child, Tuberculosis, Malaria, have robust methods and techniques for implementation that have yielded results for decades. Need to look at mechanisms to ensure that the existing framework for these are continued and the data be acquired using a pull mechanism.



Health stack NITI <healthstackniti@gmail.com>

Sponsorship offer for your blog

1 message

Maria <maria@seomediaworld.com>

Thu, Aug 2, 2018 at 6:16 PM

Reply-To: maria@seomediaworld.com

To: healthstackniti@gmail.com

Hi naavi team,

Hope you are doing well. I am interested in publishing articles on naavi.org. As I currently represent a client in Business/finance niche and he is interested to get featured on your website. Before we take this forward, I'd be grateful if you could share with me the following information:

1. Share cost of publishing permanent content on your site with 1-2 dofollow link & example post
2. How much do you charge to add link back to our client's site from your already published post?
3. How much do you charge for posting casino/gambling related content?

Also, if you have other sites, where I can publish guest posts, please feel free to share them with me.

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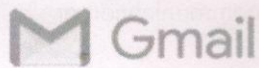
Will be looking forward for your response!!

Regards,

Maria / Blogger Outreaching Service

<http://www.seomediaworld.com> | Email: maria@seomediaworld.com

Not interested? Please unsubscribe from here



Health stack NITI <healthstackniti@gmail.com>

FICCI's Inputs on NHS Strategy and Approach Document on the National Health Stack

1 message

Health services Ficci <healthservices@ficci.com>

Thu, Aug 2, 2018 at 4:45 PM

To: "jyoti.khattar@nic.in" <jyoti.khattar@nic.in>

Cc: "rskumarifsdirector@gmail.com" <rskumarifsdirector@gmail.com>, "healthstackniti@gmail.com"

<healthstackniti@gmail.com>, Shobha Mishra Ghosh <shobha.mishra@ficci.com>, Health services Ficci

<healthservices@ficci.com>, Anirudh Sen <anirudh.sen@ficci.com>, Kapil Chadha <kapil.chadha@ficci.com>

Dear Ms Khattar,

At the outset, we congratulate NITI Aayog on this very ambitious project which, if successfully implemented, will be a game changer, and has the potential to truly transform Indian healthcare and the wellbeing of its citizens.

The document, which depicts a broad vision about the framework of a National Health Stack, appears promising, however the key points shall be the sanctity, authenticity, honesty and completeness of medical data entry, at source, which through complete and effective adherence to the approved EHR Standards for India, can effectively be taken care of.

We at FICCI, are pleased to share our observations and inputs on the document which we hope would be considered favourably.

We would be happy to work with the government and continue our support in this endeavour.

**Best regards,
Shobha Mishra Ghosh**

Shobha Mishra Ghosh
Asst. Secretary General
FICCI
Industry's Voice for Policy Change
Federation House, Tansen Marg, New Delhi 110 001
T: +91-11-2348 7445
F: +91-11-2332 0714

W: www.ficci.com

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**National Health Stack_FICCI Inputs.pdf**

225K

Thu, Aug 2, 2018 at 4:46 PM

Dear Sir,

Health services FICCI (Health Services FICCI) is a leading industry body representing the health services sector in India. We are pleased to have been invited to provide inputs on the National Health Stack.

The National Health Stack is a key initiative of the Government of India to create a common framework for the health services sector.

We have reviewed the National Health Stack framework and have identified several areas where we believe there is a need for further clarification and input.

The National Health Stack framework is a good starting point, but it needs to be more specific and detailed. We have identified several areas where we believe there is a need for further clarification and input.

We have identified several areas where we believe there is a need for further clarification and input. We have identified several areas where we believe there is a need for further clarification and input.

We would be happy to work with the government and continue our support in this endeavour.

Best regards,
Shri. Nishu Chandra

Shri. Nishu Chandra
Joint Secretary General

Health Services FICCI
New Delhi, India

Health Services FICCI
New Delhi, India

Health Services FICCI
New Delhi, India

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FICCI Inputs on National Health Stack (NHS) Strategy & Approach Document

The intent to support the changing healthcare landscape in India with a visionary digital framework is a step in the right direction, especially at this time when the Government of India is close to launching the world's largest public funded healthcare program.

Digitising health records at all stakeholder levels across the continuum of care, if done successfully, can lead to significant improvement in improve efficiency, transparency, access and quality of care delivery.

FICCI would like to submit the following inputs on the Strategy & Approach Document:

FICCI Inputs on Key Component of NHS	
National Health Electronic Registries	• Master Health Data: EHR should be the single source to manage master health data of the nation and not registries. Plurality of "National Health Electronic Registries" may not be a practical approach. • Paper-less layer for storing health records can have grave consequences, as registries are typically disease-oriented instead of being individual-oriented. Making the right segregation will pose a significant challenge to all stakeholders, and hence EHR is recommended. • Regarding the design principles, in the section - 'Open API's' the statement "Creation, updation and retrieval of data must be possible using open APIs" needs further elaboration as the very nature of Open APIs makes them prone to vulnerability and robust data security mechanisms would need to be employed. • "Beneficiary Registry" should capture information beyond health insurance programs and should have a strong focus on prevention, wellness and curative aspects of care. • Healthcare information being highly personal, sensitive and consequently ultra-confidential, beneficiary-to-beneficiary linkages pose a significant threat. Unless implemented properly, it can lead to legal challenges and significant non-participation by individuals and solution providers. Patients may opt out of health programs for HIV or Mental Health, due to the fear of social stigma, if they are not convinced that the records are secure
Coverage and Claims Platform	Policy Engine • The concept of Machine-readable Policy Mark-up Language is very innovative but needs further elaboration Claims Engine • Auto-adjudication rules pertaining to Fraud Management Service lacks details related to the rating score, probably the most crucial step in the algorithm (page 26). These need elaboration.

	Fraud Management Services Details of how Personal Health Records (PHR) will be used to avoid frauds needs to be provided
Federated Personal Health Records (PHR)	- Unless created by highly experienced professionals trained to make the clinical observations, PHRs are not the best type of records for clinical management of patients. In case PHR is synonyms to Electronic Health Records (EHR), then it should be referred as only EHR, to avoid any ambiguities. Key guiding principles for the Framework- "Minimal changes to existing Health Record Formats" - Any changes to an already-created health record are strictly forbidden to ensure no retrospective changes are carried out. The correct mechanism has been dealt with in the EHR Standards for India and this principle should be revised accordingly - A mechanism for standardization of information capture has to be created, otherwise rule driven policies and analytics will not be effective
National Health Analytics Platform	- The National Health Analytics Framework can be structured with disease surveillance for diseases/conditions covered under National health programs - Coverage of preventive and wellness programs should also be included within this framework - Additional aspects like Patient safety related quality indicators and reduction of the disease burden with efficient and transparent cost controls should also be incorporated
FICCI inputs on Overall Framework of NHS	
Guiding Principles for Overall Design of NHS	Interoperability through open APIs and open Standards - Strict adherence to EHR Standards will ensure true interoperability and help automate claims management including processing and adjudication thereof Strong Data Governance "Mechanisms for anonymisation" should be in line with the appropriate section of the EHR Standards for India (2016) Ensuring Accessibility through use of Layered Design - The term "audit trace" needs to be replaced by "audit trail" Based on Common Open Source to Create Public Goods - Open source requires that adequate data protection measures are put in place to ensure that the data remains safe and secure at all times

General Observations	• The underlying architecture of the proposed platform needs to be sufficiently robust to support the population of the entire nation • It needs to be ensured that an individual's problems related to Aadhar does not become a barrier to access essential services • The platform should also cover electronic prescriptions and pharmacy services • There should be a single Master Patient Index (MPI) standardization across the country with option to merge multiple records on request • A common framework for claim management for insurance providers and TPAs' should be an integral part of this platform • Common rules based on the State/Center level policy on eligibility (like economic status- BPL or demographic) should be established, so that insurance claims and approval can be automated • Patient should have option of "Right to Forget" or not to participate in the collection of data, this will nullify his/her eligibility to service under free care
---------------------------------	---



Health stack NITI <healthstackniti@gmail.com>

Comments on - National Health Stack Consultation Document

2 messages

Angshuman Sarkar <angshus@thoughtworks.com>

Wed, Aug 1, 2018 at 10:34 PM

To: healthstackniti@gmail.com

Cc: Sruti Sridhar <ssruti@thoughtworks.com>

Dear Sir/Madam

Congratulations on setting health as a major national agenda, linked with outcomes towards development of our population health and towards economic development. We always believed that the necessary technology has been present to realize this dream, what's needed are the "political will" and operational and legal policies to implement it.

We are sending our comments to the consultation document attached with this email. We hope that our feedback will help to strengthen the architecture and vision and lead towards a comprehensive India Health Stack definition.

Please do not hesitate to mail back should you require any clarification or further comments.

Thanks and regards

- Angshuman, Sruti

**India National Health Stack - Comments.pdf**

228K

Angshuman Sarkar <angshus@thoughtworks.com>

Wed, Aug 1, 2018 at 11:47 PM

To: healthstackniti@gmail.com

Cc: Sruti Sridhar <ssruti@thoughtworks.com>

Dear Sir/Madam,

Please ignore the previous document attachment sent earlier, and refer to the attached document in this mail instead. I apologise for not sending the right version of the document.

Thanks and regards

- Angshuman

[Quoted text hidden]

**India National Health Stack - Comments - V1.pdf**

228K

Comments on National Health Stack

Approach and Strategy Consultation Document

July 2018

Angshuman Sarkar

Principal Consultant, ThoughtWorks Global Health
angshus@thoughtworks.com
+91-97315 6280

Sruti Sridhar

Senior Analyst, ThoughtWorks Global Health
ssruti@thoughtworks.com
+91-9819349728

Disclaimer: The views and opinions expressed in this document are those of the authors and do not necessarily reflect the official policy or position of the employing organisation, ThoughtWorks Technologies India.

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Context

Congratulations on setting health as a major national agenda, linked with outcomes towards development of our population health and towards economic development. We always believed that the necessary technology has been present to realize this dream, what's needed are the "political will" and operational and legal policies to implement this, not just under purview of a demand-supply mechanism, but part of the Nation's intent towards betterment of its citizens' interest and human capital - for common public good. The NHS consultation document, also portrays a vision for a connected digital health ecosystem for India to support existing and future health initiatives by laying out a foundation which is not targeted at point solutions or specific program or initiatives. The realisation of the vision will be quite a challenge, and its benefits may take years to realise. Any such ambitious and disruptive mission, needs an impetus and we are hopeful that Ayushman Bharat and NHPS will provide that. We are excited to learn that NHS is imagined to be built for NHPS but designed beyond NHPS.

Glossary

1. NHS - National Health Stack
2. NHPS - National Health Protection Scheme
3. PM-RSSM - Pradhan Mantri Swasthya Suraksha Mission
4. HWR - Health Worker Registry
5. MPI - Master Patient Index
6. HDF - Health Data Fiduciary
7. HDR - Health Data Repositories
8. ASA - Aadhar Service Agency
9. CIDR - Central Identities Data Repository
10. UIDAI - Unique Identification Authority of India
11. HDR - Health Data Repository
12. PHR - Patient Health record
13. EMR - Electronic Medical Record
14. EHR - Electronic Health Record
15. NHP - National Health Policy
16. FHIR - Fast Health Interoperability Resource
17. ICT - Information, Communication & Technology
18. PHC - Primary Health Center
19. SC - Sub Center
20. NCD - Non-Communicable Diseases
21. MCTS - Mother & Child Tracking system
22. IHIP - Integrated Health Information Platform
23. HIE - Health Information Exchange
24. SHR - Shared Health Record

Summary

National Health Stack is aimed to improve access and affordability of healthcare, facilitate public health programmes, for tracking & processing insurance policies and claims, and stimulate medical research and health analysis. The architecture and design of the stack is intended to support existing and future health initiatives, powered by both public and private participation.

The India Health Stack will have four key components – registries of health service providers and beneficiaries, coverage and claims platform, a federated personal health records framework and national health analytics platform. It will also include other components like digital health IDs, health data dictionaries, supply chain management for drugs, payment gateways and more.

While we acknowledge that the incentive model is the driving force for realization through the demand-supply mechanism as laid out through Health-and-Wellness Centers and PM-RSSM, and that a financial mechanism is crucial for rollouts, we are *apprehensive* of the limitations and constraints that may arise to realize the broader “common public good” agenda.

The core intent is articulated as *‘enable on time payments for the service providers’*¹ - we feel this should go beyond this. The immediate attention maybe for PM-RSSM, but the architecture and design must be for the entire health services of the nation, iteratively realized.

Some of the important aspects that we want to highlight are trust/accountability, safety/privacy areas of the envisaged ecosystem as well as operationalisation challenges and needs.

In this document, we have tried to articulate our understandings and assumptions, put forth our point of view on architecture and design, operationalisation aspects, queries and suggestions wherever applicable. We hope that our feedback will help to strengthen the architecture and lead towards a comprehensive India Health Stack definition.

¹ National Health Stack, Approach and Strategy, Consultation Document July 2018 - page 40

Components of the architecture

The comments are organized by the components of the architecture as explained in the consultation paper.

Registries

The consultation paper while has given names to the registries, we think it's better to choose the appropriate nomenclature that's understood by all.

- Provider Registry: This is commonly known as **Facility Registry**.
- Doctor Registry: We don't quite understand if this is exclusively for Doctors/Physicians alone. Healthcare services are provided by 'practitioners' who may be
 - physicians, dentists, pharmacists
 - physician assistants, nurses, scribes
 - midwives, dietitians, therapists, optometrists, paramedics
 - medical technicians, laboratory scientists, prosthetic technicians, radiographers
 - social workers, counsellors, professional home carers,
 - receptionists handling patient registration
 - IT personnel merging or unmerging patient records

Generally all the above are bracketed under a term 'care providers', and the systems they are managed referred as 'Health Worker Registry' (HWR). Also, if the intent is to define separate registries by the categories of practitioner, then we believe an aggregator API system unifying all different underlying registries will be suitable.

- Beneficiary Registry - While we understand the initial focus in on the insurance coverage side where it is common to refer a patient as a 'Beneficiary' but in the broader vision of the National Health Stack, we think it's better to be called as 'Patient Registry' or *Master Patient Index (MPI)*. From the paper, we are unclear about operation of such a registry
 - We assume this system/database should be controlled by a Government Agency - that keeps the patient basic information (name, DOB, address, demographic, socio-economic etc).

- The Index should operate as a patient-cross-identifier, linking various IDs (Aadhaar, Election ID, Birth Certificate number, Passport etc) to enable discovery.

Health Data Fiduciaries

“Health data fiduciaries” (HDF) - assuming public/private agencies are likely to be such an agency as well, it’s important to define what roles, governance, protocols such Fiduciaries will need to comply to.

1. Does this imply that the HDFs are the sole intermediaries for getting access to patient records? We are unsure whether HDFs operate in the mode like ASA , which in turn connects to CIDR for Aadhaar data access.
2. We are assuming that any HDF will be governed by the protocols of the federation. This includes Fiduciary’s own access and process, and facilitating access to others.
3. We are assuming that the HDF will not host data, and only helps in facilitating information flow on basis of consent from patient.
4. It is important that the transparency aspect of HDFs are well projected, and to establish credibility of a Fiduciary. For example, the HDF must be able to provide information relating to a patient’s health record access details - (by whom, when)- a complete view of access logs of a patient’s information.

Custodian (host) of the data

1. Based on illustration in Exhibit 4², we are assuming that both private and public entities will be the host, not the HDF itself. Let’s call them as “*Health Data Repositories*” (HDR). It is unclear from the consultation paper, how such HDR is regulated, what governance and protocols will it be subjected to. This is particularly important, since unlike Aadhaar, the data will not be stored in CIDR which is solely controlled by UIDAI like agency. Some of the aspects that need to be thought out are
 - a. Availability of health information (e.g. a signed health document) whenever requested
 - b. Non-repudiation of the health document once issued/published.
 - c. Transfer of document from the source HDR to another location (e.g. Digital Locker service) - if the patient no longer wishes to have his/her

² National Health Stack, Approach and Strategy, Consultation Document July 2018 - Federated PHR framework - page 30

information with a particular healthcare provider, who also happens to be a HDR.

2. While federated model works well for flexibility and ecosystem building, it also poses challenges to availability of information. For example, if private HDR is found in violation, and its "license" revoked (or the entity folded/shut-down), what would happen to the data they housed? If a private HDR is found in violation of protocol, presumably an enquiry would be setup - but what happens to data access when the investigation is going on? Are the data hosted within them still trustworthy? Availability and trustworthiness of information, has big impact on patient safety aspects.
3. A patient must have means to reclaim his/her document from the HDRs. Patient might have fallen-off with a particular private entity and in such cases, he/she must be able to ask a healthcare provider to upload her health records to another HDR (e.g a Digital Locker), and have the right to be forgotten³.
4. We are assuming that beyond their own sources of data, HDRs are not hosting other patients' data in their own infrastructure, and leveraging only the Fiduciaries and PHR to pull in individual patient data as and when required (e.g. a Patient is referred to one of its hospitals) and they are not storing existing patient data.

Federated PHR

One of the most broad and overarching concept of the stack is the PHR. This has a positive impact not just for value-added-services (insurance claims), but also for broader 'common good' and towards patient's clinical care towards accessible and quality of care, and for clinical and public health policy research. We welcome the design of a federated PHR rather than a centralized HIE/SHR approach, which in our view is not suitable for federal republic structure of India, where health is a 'state subject'.

The consultation paper lays out guidelines of the PHR at a broad level, but it is unclear of the overall architecture and essential components of the PHR. A PHR⁴ is distinguished from EHR/EMR in the sense that the health record information is controlled by the patient irrespective of the origin/source.

In a federated architecture, the following questions would need to be addressed.

³ Right to be forgotten - Justice BN Srikrishna Committee report - Personal Data Protection Bill - Chapter VI

⁴ <https://www.hsph.harvard.edu/news/magazine/fall08ehrpersonalvshealth/>

- Design of the PHR - if the data is hosted in a health provider's infrastructure, what enables the discovery of the health record?

We would think that the PHR is a collaborative system of

- *Master Patient Index (MPI)* - linkage via Digital Health ID.
- *Patient Document Index* - hosted by Government Agency - where any signed and certified patient document is indexed with minimal essential meta-data (when, where, who, purpose etc) and with the actual location reference of the patient document. The only means of accessing the Document Index is through the Digital Health ID. The Document Index must have irrefutability aspects of content covered as well, by means of hash (or similar) generated out of certified patient document.
- Health Data Repositories (HDR) - Healthcare provider infrastructures where actual patient documents will be stored, or personal document repositories like a digital locker service for clinical documents etc.
- Health Data Fiduciaries - who facilitate information flow driven by the consent architecture

The simple workflow of issuing and publishing a health record should be so - a health provider issues a digitally signed document and puts it in a document repository which must act as a Health Data Repository (**HDR**), and then updates the *Patient Document Index* for such a document discovery and availability.

- The consultation mentions data to accumulate in patient-controlled-repository⁵. This control must transcend beyond consent for information sharing.
 - "Ownership of data"⁶ as per National Health Portal - also that the patient must be allowed to have information relevant to details of disclosures of information. This should apply to HDFs as well - relating to information access - who, when etc.
 - Revocation of any 'pre-auth' to Fiduciaries or Data Repository.
 - Means of defining of what information may be shared with whom.
- There is an oblique reference to schema-less federated PHR, how this ties with foreseen "doing away with the need to conduct unnecessary tests as all records" is unclear.

⁵ National Health Stack, Approach and Strategy, Consultation Document July 2018 - Page 30.

⁶ https://www.nhp.gov.in/data-ownership-of-ehr_mtl

- Mandated PHR - The consultation paper reflects on 'Mandated PHR'⁷ where *"all service provider EHRs and stand alone PHRs which include wearables, mHealth devices and health apps etc should have APIs compatible to NHS PHR"*
 - It is unclear that if data is hosted in a data repository (say HDR), then what is the need for wearables and devices to have API compatibility for discovery and access
 - We feel that what needs to be mandated is - integration following NHS APIs for publishing/providing signed patient documents.
- Information access to health records
 - The access facilitated by the Fiduciaries, must go beyond the consent of a patient, and subjected to combination of WHO+WHAT+PURPOSE. For examples, as part the Data Ownership guidelines for EHR⁸
 - Sensitive Personal Data (SPI) relevant to Mental Health, or sexual orientation or HIV/STD patient data may not be shared or disclosed to other providers beyond the care stream, without prior approval.
 - An appropriate practitioner may have access to Psychotherapy notes, but a Lab clinician who might need to know the conditions or Doctor's notes for a lab order, or an ASHA worker to have restricted view of clinical history.
 - There are cases where a healthcare provider can deny information based on opinion of appropriate healthcare professional if released information would somehow endanger the life/safety of patient or others.
- Another point to think through is regarding information access of patients who can not provide consent - in cases of children, elderly etc? or in case of emergency where access to patient information can determine a life-death scenario

National Health Analytics Platform

This is one of the most significant components in the mix, and as articulated in the consultation paper - creation of anonymised and aggregated datasets that will present the overall direction of health of the country/state/district, publication of open datasets etc has far reaching national impact on data-driven decisions and targeted policymaking in the health sector, while increasing increase transparency, accountability, civil society engagement, and innovations in service delivery. We also think that its prudent to think of a horizontal expansible for in-future systems for specific analysis and decision

⁷ National Health Stack, Approach and Strategy, Consultation Document July 2018 - Page 34

⁸ https://www.nhp.gov.in/data-ownership-of-ehr_mtl

science. At the same time, we are guarded of the prospect of intent and outcome of analysis done by parties.

- Anonymisation - while the consultation paper talks about it, anonymisation has many facets. Anonymisation ought to be done for personally identifiable information (PII), or sensitive personal information (SPI), and it should be even be applicable at content of the health records
 - Need to mask address information, including pincode
 - Need to mask clinical information like drug brand names - only share/process generic drugs
- We are assuming that the analytics platform will be hosted by Government. In case any in-future horizontal component are to be hosted by private entities, wherein they process information - access/availability to information and content must be governed by purpose/intent of such systems as well.
- While we understand that Analytics Platform may initially target only insurance data aspects, we find no mention of usage of this platform for other purpose like SDG goals - which is a key reflection on how the country is doing on 'Health and well being'. A connected ecosystem allows for tremendous potential of tracking overall health indicators of a country - not just meeting SDG 2030 goals.

Policy Engine

Unified Multi Policy View: While getting an unified view all effective policies is great for a patient, this also opens up possibilities of misuse.

- Hospitals tend to take advantage of insurance holders - a patient's bills are almost always higher if claimed from insurance compared to if paid from own pocket.
- Another important requirement is that the framework is extensible. Govt/State Insurance policies may change - for example, Fee by category, Fee for Service, Disease Groups etc.

Suggestions

- The policy engine must know all the health insurance policies that a patient has. It would be absolutely groundbreaking if the policy engine can inform what all policies a patient is entitled to. Or to know from the PML, what is covered under a particular policy and coverage amount beforehand so that a patient may arrange for suitable funds if needed.

Digital Health ID

We welcome the thought process of a 'unique system wide' Digital Health ID for the patients and that is different from Aadhaar. It is unclear from the consultation paper, regarding the entities that would be responsible for generation of such Digital IDs, distribution and maintenance.

We think the generation engine ought to be a central system owned and operated by a Government Agency. We fear that if it requires another enrollment process, then it can not be easily operationalized. For that purpose, the health service providers (hospitals/clinics or health programs) should be part of such process.

- If we assume that the Health IDs are generated on-demand only, then we need to think about the Hospitals/Clinics that are not connected or has intermittent connectivity.
- If we assume that Health IDs are to be pre-generated and distributed through entities like health facilities or other programs, then there must be a mechanism of resolving of registration authority for that ID and traceability of that.
- We should assume that duplication of a patient with multiple identifiers will be there. Hence the architecture should address means and mechanism for detection of duplication and resolution process.

Fraud Management System

We are in agreement conceptually for the design. We would like seek clarity on some aspects below and highlight certain potential challenges.

- The consultation paper mentions - "If fraud is detected, all claims from hospitals are put on hold⁹" - in our view, this can be really disruptive. A claim can potentially be detected as fraud given the accompanied data, which may be erroneously entered, thus acting as a deterrent. There ought to be a mechanism of turnaround time for resolutions, or to flag specific claims as suspicious or to arrive at a decision based on 'likely reason' from the FMS - but withholding all claims process can be huge setback to the eventual beneficiary and likely for manipulation resulting in out-of-pocket-expenditure.
- The FMS (possibly in combination with the Analytics Platform) - should analyze premiums and rejections to ensure 'fairness' for the patients. Insurance companies deny claims or raise premiums based on health data.

⁹ National Health Stack, Approach and Strategy, Consultation Document July 2018 - Page 28

- **Linkage of FMS to PHR**

Does this imply that FMS needs to access PHR as a source of truth?

If so, this implies that all hospitals must be ready with ability to issue digital health records documents for patients in time (as and when service is done) - in karnataka alone there are 541 private and 653 public empanelled hospitals/clinics.

Principle: Privacy and Security By Design

The consultation paper puts the privacy and security as one of the guiding principles.

It provides Ministry of Electronics and Information Technology (MeitY) Electronic Consent Framework and 'Policy for Open APIs' as reference frameworks and policies.

NPDSA and Policy for Open APIs

The policy applies to Indian Government Agencies and not subjected to private entities. It applies for e-Governance and towards G2G and G2C services. Given that private enterprises will be stakeholders in the NHS set up, the policy applicability would need relook.

MeitY Electronic Consent Framework

The consultation paper mentions Ministry of Electronics and Information Technology Electronic Consent framework as means for access to patient health information. The prime here is the 'Consent Artifact' but we are unsure how this artifact would be appropriately applied for accessing sensitive personal information such as Health Data. As described above in the PHR section, our opinion that access to information and for processing must be looked from WHO+WHAT+PURPOSE, and also subjectivity of the usage context.

We are aware of the 'Consent Collector' - *An entity that interacts with users and obtains consent, a role that can be played by the Data Consumer or Data Provider or Service provider.* The MeitY consent framework also mentions that "*the consent collector may also obtain data sharing authorization from the user differently (e.g., by having the user click a button or by signing a paper form).*" - There must be mechanisms to ensure that patient's awareness for such information usage. Given immediate target population demographics (underserved and from rural), should we assume that the patients have the necessary awareness to judge and consent appropriately?

Even beyond the consent collection, there is also security and confidentiality danger of coercion and by means of 'social engineering' and 'phishing', as seen with Aadhaar based information access.

We believe that the most important aspect is consideration of legal framework for the consent. There must be regulatory interventions to prevent harmful use of a patient data even if they have given consent. The MeitY consent framework is a technical framework, and in absence of appropriate laws and policies, there is chance that requirement for consent maybe discretionary and arbitrary.

We also need to see the 'access', 'usage' towards patient 'protection' and 'privacy' in light of policy drafts, mainly

1. Digital Health Information in Healthcare Security Act (DISHA)

The draft DISHA¹⁰ act mentions that *'digital health data, whether identifiable or anonymised, shall not be accessed, used or disclosed to any person for a commercial purpose and in no circumstances be accessed, used or disclosed to insurance companies, employers, human resource consultants and pharmaceutical companies, or any other entity as may be specified by the Central Government'*

2. Personal Data Protection Bill 2018, Justice BN Srikrishna committee report

Recommends that processing (collection, recording, analysis, disclosure, etc) of personal data should be done only for "clear, specific and lawful" purposes. Only that data **which is necessary** for such processing is to be collected from anyone. This means that fiduciaries or processing agencies must articulate and educate what purpose and what data is being processed.

- a. This also mentions that government may be allowed to process data if considered necessary for any function of Parliament or State Legislature. This is vague but also puts responsibility on government to disclose what purpose and what data is being used for. The reason is not referenceable

¹⁰ DISHA Chapter IV - Section 29 Purposes of collection, storage, transmission and use of the digital health data, list 5 - https://mohfw.gov.in/sites/default/files/R_4179_1521627488625_0.pdf

in nature. Meaning, if someone's sexual orientation data was processed to generate a measure for certain survey purpose, it can not be sent to Ad Agency to send targeted ads.

- b. The 'right to be forgotten' recommendation also would mandate that consent given once cannot be perennially used for accessing patient data. The HDF must adhere to that. This in turn should have cyclic effect on any entity with whom the data has been shared in the past.
- c. Specifically "sensitive" data must need explicit consent.

We also need to think through how that the stack will link up with Aadhaar for identification and access. Aadhaar Act 2016, section 2(k) specifies that Aadhaar will not include 'Medical History'. While technically this is true, if linkages are established for identity and access for medical history, we need strong legal provisions to safeguard patient interest.

Patient safety and confidentiality, their information access, data protection and sharing should be subjected to well articulated, precise laws that are well understood and interpreted uniformly by the ecosystem. Including the two policies mentioned above, there are other laws which may be subjected to systems dealing with patient data - for example, IT Act 2000, health condition specific ones like Mental Health Act 2017 etc. Like many emerging economies, we lack precise and dedicated privacy laws, relying instead on combination of consumer protection laws, telecommunications policies, human rights provisions and/or constitutional rights to equality etc. Significant steps are underway towards this in India - especially with DISHA and Justice BN Srikrishna committee reports towards Personal Data Protection Bill 2018. A platform of this stature must continuously evolve with evolution of laws themselves.

It is also important to think through how the legalities are framed so as to ensure that patients can leverage RTI acts relating to 'Purposes of collection, storage, transmission and use of the digital health data' - who collected the information, where is it stored, who the data was shared with, who keeps getting updates on data, how data is leveraged.

Security and privacy safeguards also must tie with the trust and accountability aspect, which should not be just for transaction and audit trails but reflective in actions and judged by citizens/beneficiaries impressions, quality of service availed, grievances addressed, time for turnaround etc.

Analytics Engine for Patient Safety and Confidentiality

In a connected system so envisaged with access to PHR for clinical care and services and claims, we should assume that there would be misuse during access/processing/curation/analysis. In view of the analytics platform architecture, we think there ought to be systems in place for analyzing patient data access and utilization of such information. There ought to be an analytics engine, which needs to constantly analyze access patterns of patient information and usages to avoid misuse. Such a system can be used for proactive audits, and initiate regulatory compliance checks and verifications.

Interoperability and Standards

To establish a connected health ecosystem, where interoperability is mandated by Open and standard APIs, its imperative to relook into data standards and information exchange standards. This is assumed to be outside the purview of the consultation paper where it does not make any specific view point on the standards but provides reference to Health Record IT Standards as laid out by NHP¹¹.

The 'Electronic Health Record Standards for India 2016'¹² (see also [here](#)) provides a broad list of standards and we feel that NHS provides an opportunity to minimize the standards especially regarding information exchange and also emphasis on minimal datasets to encourage uptake. For established private entities (like Health Informatics systems providers), this might involve adoption challenges for conversion of one document standard to others, but this is a unique opportunity to choose extensible standards and reference models for structured information, especially relevant to patient health records description. For example, the NHP standards document does not mention HL7 FHIR as a standard, whereas this is possibly the biggest work relating to standards with extensibility that is being done worldwide, with healthcare system providers rapidly adopting to FHIR.

While Open and standard APIs will ensure syntactic interoperability, equal importance must be given towards semantic interoperability to ascertain that what is sent is what is understood. India already has a defined terminology standard like SNOMED-CT which is made available by NRC CDAC, Pune. This terminology standard is free for distribution and adoption for all healthcare providers in India as India is member and has "country license" member of IHTSDO. While India has been a member of IHTSDO

¹¹ https://www.nhp.gov.in/categories-for-adoption-of-standards_mtl

¹² <https://www.nhp.gov.in/NHPfiles/EHR-Standards-2016-MoHFW.pdf>

since April 2014, adoption to SNOMED-CT has been low. We must make all efforts to promote such adoption.

Having defined the standards is not enough though. A suggestion, we would like to make, is setting up National 'Interoperability Labs', wherein a lab infrastructure would be provided for programs and projects to bring in their ICT systems, to participate in a connect-a-thon to ensure that health systems are functioning and working together in a coherent manner. Such 'interoperability lab' may be means of certification to ensure interoperable systems.

Operations

While Aadhaar as Identifier can be hugely beneficial and can act as one of the primary identifiers, it should be looked as an “augmenter”, enhancing, delivering and provisioning services and benefits. We need to be mindful that health service of any sort must not be withheld/delayed for anyone not producing/linking Aadhaar.

Addressing Demand Side needs

If aligned with Pradhan Mantri Swasthya Suraksha Mission (PM-RSSM) - then there is a risk that this would be used only for cases where hospitalization is involved.

- Thus leaving others suffering from chronic cases, or other users who are not leveraging the insurance schemes
- We will lose out on important clinical information that is required for continuity of care for patient and for medical research
- If one of the intents of NHS is to ensure availability of health data for medical research, we must ensure that all types of clinical information - hospitalization or not must be part of the NHS - like for example MNCI programs which typically are done by health workers on field.
- Also does it limit to only empanelled facilities/orgs? What is the plan to expand this beyond the empanelled orgs.

If the intent is also bring the Health & Wellness Centers under the ambit of the NHS, a point to be noted is that currently there is no individual patient level data recorded at the Primary health centers and Sub centers. However, the information collected at these levels is vital for referral of the patient higher up in the chain and also for medical research. Information about many NCDs and communicable diseases are available at these levels and must be utilised.

- What role do we see these centers playing in the NHS?
- How will the information collected at these centers be part of the PHR? How will a provider at the PHC access the information from PHR?
- Here we are assuming here that even patients coming to SCs & PHCs will be identified by a Digital Health ID.

Some questions with regards to the PHR

- How will hospitals with no EHR/EMR become a part of the PHR? What are the mechanisms of ensuring that the patient data is part of the PHR in such setups?

- Similarly, how are hospitals with an on Premise EHR/EMR, but no outside connectivity, expected to connect to the PHR?
- Are we mandating the health facilities to have the required infrastructure to be part of a PHR? In which case, there will be a lot of challenges in operationalizing this and ensuring this.
- It is possible that a patient has records across multiple health facilities. So, where is the information about the different locations of a patient's records & the changes to the patient record tracked?
 - The PHR must have a way of knowing each time a record is created or edited.
 - There should be ability of non-repudiation when such information is published to the PHR.
- Recently, the Ministry of Health & Family Welfare has awarded the contract of building the Integrated Health Information Platform (IHIP) for India. How is the NHS aligned to IHIP?

Point-of-care systems

To enable this data driven ecosystem, there must be adoption for points-of-care systems (like EHR/EMR, HIS, HMIS etc), through which the data will come onto the system. There is severe lack of quality point-of-care system appropriate to usage context that is also cost effective.

Complexity often drives people away especially when applied to simple cases and usage contexts. A comprehensive system for clinical research maybe appropriate in Medical colleges, but not in rural sub center. At the same time, smaller places do not mean suboptimal solutions.

We should leverage the medical knowledge for doctors, rather than imposing complex clinical systems that take away their time. For example, a simple reverse chronological view of patient clinical history (imagine a simple PHR read-only view), is a significant game changer for doctors who can then use his/her clinical judgements for appropriate care.

Therefore, emphasis must be put on availability of appropriate solutions, encouragements/incentives for adoption and usage of such systems at service points.

Change Management and adoption

We did not find a mention of change management in the consultation paper. This will be important component to define and address when we think of operationalizing this at the health facilities with least disruption to their existing processes. Much of the

implementations fail, because the change management is not addressed as part of the rollout. Another significant reason, especially in public health facilities, is the workload and available time for practitioners (average of 2 - 3 mins per patient). Innovative solutions can help bridge such barriers. At the same time, we ought to be clear about objectives and outcomes while recording information about patients in such time constraint environments. There should be emphasis for collecting bare minimum requirements of clinical data, routine information which otherwise can be major deterrents. For example, for an Acute case of dehydration or gastroenteritis, minimum data like presumed diagnosis, medications prescribed should be good enough; or in case of minor procedure, the data requirement should not be how many sutures and precise body site.

National Health Programs

- We have specific national health programs running parallelly for diseases like TB and HIV/AIDs running. How are we planning to utilise the information captured as a part of these programs in NHS?
- Similarly, we will have to consider systems like MCTS (Mother & child Tracking system), which already track the Mother and child on an individual basis
- There are other sources of patient information like the National Cancer Grid which will be useful to the NHS
- The question is how do we map all the patients across these multiple programs under a single health ID and have the information available in through the PHR.

Advisory Groups

We feel that this endeavor should have a advisory group consisting of representation from Government Agencies, Private enterprises, Technology organizations, Academia, Public Health Experts, Civil Society, legal and policy experts and Medical Professionals. We feel that only with a collaborative approach can realise the dreams of 'common public good'.

Learning Ecosystem

While addressing the change management requirements, we should actively try to create a learning ecosystem to develop combination of technologies and support resources available to help organizations and individuals learn within the environment in local context. This may mean creation of a repository of knowledge and information for the program, creation of competency framework for both care providers and information

systems developers, education and training courses on eHealth and establishing a peer learning network etc.

Digital Health Awareness

A huge task is education to be imparted (in a continuous manner) for both the users of information and providers of information (patients). While we are on a mission towards digital literacy, many such missions¹³ are targeted towards skill building of care providers. In the case of health data and connected ecosystem, equal effort must be undertaken to make patients aware of their information usage, potentials, risks, rights etc of this digital health ecosystem.

This is especially true, where under the current focus towards Ayushman Bharat, the profiles of patients are likely to be the underserved (and rural), for whom the digital divide has already started to alienate. The NHS operating framework must be an way of inclusivity for them.

¹³ NDLM - <http://nielit.gov.in/calicut/content/national-digital-literacy-mission-ndlm>

About Authors

1. Angshuman Sarkar, Principal Consultant, ThoughtWorks Global Health

Angshuman Sarkar comes with over 23 years of experience in the software development industry and currently leads the Health practice in ThoughtWorks, India. He has been working in the Global health and Health Informatics Space for has expertises in building platforms & solutions specific to the global/public health domain in resource-constrained areas and has been instrumental in fostering collaboration with various medical informatics communities. He is the Technical architect of Bahmni, an open source Hospital Information System for low resource environments; and lead architect of Bangladesh National Health Information Exchange. He has led implementations/rollouts on the ground for Community health solutions, clinical systems at hospitals etc, besides advising international humanitarian organisations and public health entities on Digital Health.

2. Sruti Sridhar, MPH, Senior Analyst, ThoughtWorks Global Health

Sruti is currently part of the Global Health team and the Health Practice in ThoughtWorks where she has worked with Ministries of Health, National & International NGOs and hospitals to help build digital interventions for their organisations. She has been part of many vertical and research projects - including TB, HIV etc. Over the years, she has been instrumental in the development & evolution of the Bahmni - an open source Hospital Information System for low resource environments. She comes with a background in Public Health & Biomedical Engineering and has special interests in Health informatics, data driven decision making, Monitoring & Evaluation and Program Management.

About ThoughtWorks

ThoughtWorks is a global Business and IT consultancy that provides end-to-end software development and solutions delivery.

ThoughtWorks has been working in the Global health space over the last decade, with Ministries of Health, International NGOs, Humanitarian organisations and development organisations. We work with these organizations in creating their Digital health strategy and in custom solution design, development & implementation, most appropriate to their needs.

We have been instrumental in developing & contributing to many prominent open source platforms/products/solutions in the digital health space - EMR/EHR products like Bahmni & OpenMRS, Reporting & Analytics platforms like DHIS2, the Shared Health Record (SHR) platform, Community health applications like MoTech & Drishti and emergency response applications like RapidFTR, Supply Chain and Distribution platforms like OpenLMIS, terminology and metadata management systems like Open Concepts Lab. Many of these have been scaled at national levels in countries of Asia and Africa.



Health stack NITI <healthstackniti@gmail.com>

Feedback on NHS

1 message

naavi iadpp <naavi.iadpp@gmail.com>
To: healthstackniti@gmail.com

Wed, Aug 1, 2018 at 11:13 PM

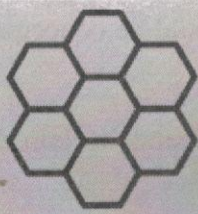
Dear Sirs

Please find enclosed our views on the NHS with some suggestions.

Hope it would be useful.

Naavi
Coordinator: Indian Academy of Data Protection Professionals
Bangalore

 **nhs_response_iadpp_ds.pdf**
792K



INDIAN ACADEMY OF DATA PROTECTION PROFESSIONALS

37, "Ujvala", 20th Main, BSK First Stage, Bangalore 560050
E Mail: iadpp.naavi@gmail.com; Web: www.iadpp.in ; Mob: 9343554943

Date: 1st August 2018

Some Feedback on the Consultation Paper on the National Health Stack-Strategy and Approach

1. Managing Public Perception is key to reduction of delays

The National Health Stack (NHS) is the technical foundation for the ambitious Ayushman Bharat program. The success or failure of the Ayushman Bharat program and the consequences thereof would be dependent on the success or failure of the NHS. Hence this is a project of critical national importance on which the destiny of the nation rests.

However, the program is likely to attract focussed criticism from the biased media and any shortcomings would be blown out of proportions.

The need to manage the public perception of the uniqueness of the program should be properly assessed and should be part of the implementation program. If the public perception management is not addressed, the technical implementation would be stalled at every level and the program will not make necessary progress. The opposition to the Aadhaar scheme is an indication of the underlying potential for delays arising due to mismanagement of public perception

"Creating Public Awareness" and "Preparing the public for using the system effectively" should therefore be an important part of the technical aspects of the project.

2. Key Concerns

Two key concerns that would shape public perception as soon as the project hits the road are

a) Privacy

b) Security

Since Health Information is a sensitive personal information, components of the NHS which involves collection, storage and processing of information fall under the umbrella of the newly proposed "Personal Data Protection Act 2018" (PDPA 2018).

The project expects the participation of the Private Sector which would be concerned with the possible breach of personal data and its consequences.

If this concern is not properly addressed, the private sector would hesitate to join the program.

The emphasis on “Anonymization”, “De-identification”, “Encryption” and other technical measures to ensure security of sensitive information is therefore a top priority. Any perceived lack of security would be not only a subject matter of criticism by the public but also potential for legal hurdles.

The project should therefore notify

- a) A Data Protection Officer with overall responsibility for Privacy and Data Protection whose role has to be highlighted right from the day the project is rolled out.
- b) Declaration of the main technology components as “Critical Information Infrastructure” under Section 70 of Information Technology Act 2000 as amended in 2008(ITA 2000/8)
- c) Declaration that any attempted disruption of the NHS would be considered as an attack on the citizens of the nation and likely to cause death and destruction that would qualify the offence to be classified as an offence under Section 66F of ITA 2000/8
- d) Mandating that the Health Subjects shall be protected by a “Cyber Insurance Program” that covers any loss that may arise to any individual as a result of contravention of any law. The loss may be covered similar to the existing accident insurance policies or similar newly constructed policies for both health hazards caused and death.

3. The Registries

The registries are an essential part of the system and cannot be avoided. From the zero date, Digital Health IDs may be created as “One permanent Digital health ID” for the individual and Virtual Health IDs for transactional use.

The seeding of the identity can be through Aadhaar but subsequent to the generation of the Digital Health ID, it should not be indiscriminately used. Only the Virtual health ID should be used for all transactions.

The Digital Health ID should be generated in a central server and the user should be provided only with a physical instrument such as a “Card” with his name and a secretly encoded customized machine readable code embedded in the card.

The user should not be able to therefore share any “Digital Health ID Card Number”. The card will have the name and address with a photograph. For card present transactions, the hidden machine readable code should be used for linking the data to the centralized unique health ID. For Card not present transactions, a virtual Health ID could be used along with a KYC type authentication.

Service providers will store only the virtual health IDs and not be able to view or see the embedded code as a number. Since this is only an embedded code read by the machines, it can be a combination of alphanumeric or other characters making it nearly impossible to be broken.

The system of Digital Health ID management would be as elaborate as the Aadhaar system but the enrolment may be done at designated the health care delivery centers such as the hospitals.

IDs for organizations may be simpler since Privacy may not be an issue here.

4. Consent

It is encouraging to note that the NHS has recognized a role for Data Fiduciaries. Their role would be crucial in managing consents of data subjects.

The “Data Trust Fiduciaries” may create three streams of data one which is identified and used by the health care operators, second which is used by marketing agencies which would be a limited data set and the third would be the set used for statistical purpose which could be anonymized.

The Data Trust Fiduciaries should be licensed on the lines of trusted intermediaries used in the Digital Signature eco system where there is a Controller of Certifying Authorities who licenses Certifying Authorities who may engage trusted Registration Agencies.

The data subjects would entrust their personal data with a chosen Data Trust Fiduciary which would provide them the Digital Health ID card for further use.

The Health care intermediaries may get the required data through the Data Trust Fiduciaries to the extent they need for providing the required service.

5. Use of Smart Contracts and Block Chain

Care should be taken not to adopt untested technologies despite the hype that may be going around some of them including the Smart Contracts and Block Chain.

6. Open Source Technology

It is welcome that NHS emphasizes Open Source technology where available. However an appropriate source code audit system should be implemented both for Open Source and Proprietary software and hardware used in NHS with appropriate security considerations in mind.

7. Miscellaneous Suggestions submitted by members of IADPP

- a. Use strong and dynamic encryption as default for all move & rest cases across the health stack
- b. Implement tokenisation and randomisation as default to make it difficult for hackers to discover the entire HID. Each set of 4 characters should be

separately tokenised and randomised and stored in different storage arrays so that it becomes difficult or almost impossible for a hacker to uncover the complete HID

- c. Impose strict and stringent penalties, including heavy fines and non bailable warrants on management of providers for misuse of Health and Patient Data
- d. Use HIPPA or stricter guidelines as prescribed in GDPR for protection of Security and Privacy of Health records
- e. Treat HID, Personal Health Records (PHR) as Sensitive Personal Data for purposes of Privacy
- f. Explicit consent must be obtained from patients for using and sharing health data and records. It should include a clear procedure for provider to explain the reasons and implications for obtaining consent. This should be mandatory like flight safety procedure explanation by Air hostess's prior to flight commencement. This procedure should be explained in the local language of the patient.
- g. Right to recall consent by the patient must be a fundamental aspect of the Health stack.
- h. Minimise and strictly limit access to individual patient health record including nature of illness etc. on a Need to Know basis.
- i. Patient health data, records and archived meta-directories cannot be used for Marketing purposes.
- j. Automated security checks for OS updates and adherence to prescribed security standards must be mandatory for Users and providers of the Health stack across all form factor of devices includes IOT, Embedded, Personal Computers and Mobile devices. Any device found non compliant at the initiation of the session should be blocked for access. This will force the user to update and create pressure on the software and hardware vendors and ecosystem to roll out patches quickly to close security backdoors and vulnerabilities.
- k. Blockchain based smart contracts if used must be of open source like Hyperledger and use a Permissioned and scalable platform. Certain implementations of Blockchain like Bitcoin suffer from a "51% attack" which means that more than half the users can manipulate it their way by acting in concert. Care should be taken in deciding on the design and type of blockchain platform to avoid such type of attacks.
- l. Information/Cyber Security tenets dictate that breach notification is the cornerstone of any law/rules and this is a globally accepted practice as well. The proposed legislation should borrow good things from various legislation of similar nature from across the globe including section where breaches under the HIPAA are classified as 1) involving 500 or more individuals and 2) Less than 500 individuals. The proposed Indian legislation should differentiate breaches as the HIPAA does. The proposed legislation should also propose compensation for severe breach to the affected individual. It should also allow class-action suits for large scale breaches (thresholds to be defined in consultation with Privacy and Cybersecurity professional bodies and groups) similar to US law.

The above are the preliminary views which may be expanded in due course.

**Submitted on behalf of Indian Academy of Data Protection Professionals by
Na.Vijayashankar (Naavi)**



Health stack NITI <healthstackniti@gmail.com>

CIS Comments on the National Health Stack (NHS)

1 message

Swagam Dasgupta <swagam.dasgupta@gmail.com>

Wed, Aug 1, 2018 at 10:44 PM

To: healthstackniti@gmail.com

Cc: 14bba052@nluo.ac.in, swaraj@cis-india.org

Dear Ma'am/Sir,

Please find enclosed the Centre for Internet and Society's (CIS) comments regarding NITI Aayog's consultation paper on the National Health Stack: Strategy and Approach.

We thank you for the opportunity to submit our views and opinions on the same.

Regards,
Centre for Internet and Society

**CIS NHS Comments for Niti Aayog Consultation draft.pdf**

298K



Comments on 'National Health Stack : Strategy and Approach'

31 July, 2018

By

Torsha Sarkar, Swagam Dasgupta, Swaraj Paul Barooah

The Centre for Internet and Society, India

General Comments

This submission presents comments by the Centre for Internet and Society ('CIS') on the consultation paper concerning 'National Health Stack : Strategy and Approach' (NHS Paper), released on 9th July 2018, for comments. It must be noted that these comments have been put forth without an adequate opportunity to consult how the NHS Paper may be affected by the Srikrishna Committee Report (which came out mere four days before the submission closed).

CIS is grateful for the opportunity to put forth its views and opinions on the consultation paper and the subsequent technology proposed under it. The first part of the draft captures some of the general concerns surrounding the National Health Stack ('NHS'), including the sustainability of the healthcare scheme it is to be built upon, security concerns surrounding the data processed, and adoption of the new, untested technology.

The second part of the draft contains a more specific critique of the program. In this part, the four problem statements that, according to NITI Aayog, arise in any government-funded healthcare system, are discussed with reference to the technology proposed. The analysis of the platform is accordingly done with these four underpinning ideas in the background.

While CIS appreciates the process of consultation of this technology, we would nevertheless reiterate that in the face of the Srikrishna Committee Report, NITI Aayog should have ideally extended the deadline for submissions, to ensure a more sound analysis of the NHS paper against the new data regime proposed.

1.1 Introduction

- The goal of digitization in the health industry has to be done with the underlying aim of improving healthcare.
- The NHS, however, is to be built on a proposed healthcare system that ignores ground realities and sets unrealistic goals for itself
- The new model of insurance and digitization adopted under the new scheme is not backed by substantive research into the existing government insurance programs, their flaws or any indication as to how the new scheme is better.

In early 2002, UK unveiled one of the largest public sector IT Programme ever attempted, called the National Programme for IT ('NPfIT') with the goal to transform the National Health Service ('UKNHS') — a pre-existing state-sponsored universal healthcare program. This would include a centralised, digital healthcare record for patients and secure access for professionals across 300 hospitals. However, since its inception, the scheme met with criticisms as to increasing expenses, poor management, and failure to deliver the promised deliverables, and finally met its end in 2011. While its failure was a step-back for UK's healthcare system, it spurred considerable amount of literature collating to one sound

lesson: that any digitization project in the health sector should be done with three aims in mind - better health, better healthcare and lower costs.¹

In the vein of this idea, the underlying purpose of the Indian national health stack becomes a cause of concern, inasmuch that it does not serve to increase the standard of healthcare in the country. In UK, the NPFIT was built to complement an already existing, successful model of free healthcare (UKNHS), and despite this, the program had failed to thrive.

We recognize that the NHS has been proposed to be built as a supplementary tool to the government's proposed healthcare regime, Ayushman Bharat Yojana (ABY). However, the ABY's disregard for the basic economic and social realities of the country, and pitiable allocation of funds, makes its success doubtful, and as a corollary, the object and purpose of the health stack as well.

In the first of its two pronged strategy, the ABY aims to establish 1.5 lakh Health and Wellness Centres across the country by 2022, which would provide primary health care services free of cost. The total fund allocated for 'setting up' these centres is only Rs. 1,200 crores, which comes down to a meagre Rs. 80,000 per centre. It is unclear whether the government plans to establish new sub-centres, or improve the existing ones. Either way, a pittance of 80000 rupees is not sufficient. As per the reports, amongst the 1,56,231 current health centres, only 17,204 (11%) have met Indian Public Health Standards as on March 31, 2017. Basic amenities like water and electricity are scarce, if not, absent in a substantial portion of these centres. At least 6000 centres do not have a female health worker, and at least one lakh centres do not have a male health worker. Even assuming that the existing 17,204 centres are in the condition to live up to the proposed standards, the future of the rest of these 'Health and Wellness Centres' nevertheless continues to be bleak.

Additionally, a 2013 report by EY-FICCI stated that we must consider a ten year time frame as well as allocating 3.5-4.7% of the GDP to health expenditure to achieve Universal Health Coverage (UHC) — an imminent goal of ABY. However, by NITI Aayog's own admission, the centre's health budget is a mere 1.3%, which also remains largely unspent². Yet, announced in February of 2018, the government plans to achieve UHC by 2022, a thoroughly unrealistic goal.

Both the limbs of the ABY, therefore, remain oblivious to the existing problems within access to healthcare and the relevant economic and social indicators that depict a contrasting reality. In light of this, the future of the ABY scheme seems unpromising, and so the fundamental question remains - if the NHS is not built to facilitate and aid a healthcare regime, then what could possibly be the aim of the stack?

Additionally, the adoption of the new model of insurance and digitization without any research into the pre-existing insurance models also casts doubt on the entire program. Since the 1950s, India has seen various catenas of government-funded health insurance programs, be it for the civil servants (Central Government Health Scheme), or the formal sector workers (Employee State Insurance Scheme), which as reported in 2010, covered a

¹ Report of the National Advisory Group on Health Information Technology in England, 'Making IT Work : Harnessing the Power of Health Information Technology to Improve Care in England', available here

² NITI Aayog, 'National Health Stack : Strategy and Approach', available here

total of 58.5 million beneficiaries, roughly about 5% of the Indian population.³ Apart from that, there have been several other initiatives by both the centre (Rashtriya Swasthya Bima Yojana), and the states (Rajiv Aarogyasri, for instance), all of which have covered roughly 247 million beneficiaries, across the country.

Despite this, the ABY scheme and the consultation paper do not indicate how the new model would be an improvement on the pre-supposed flaws of the older programs. Sufficient proof does not exist to indicate the plausibility of the insurance packages offered, or the fact that digitization would lead to accelerated healthcare. In light of that, concerns remain regarding the feasibility of the ABY scheme, and as an extension, of the NHS.

Lastly, on July 31st 2018, Common Service Centre (CSC) and National Health Accounts (NHA) signed a MoU to implement the ABY through 3 Lakh CSCs. Under this, individuals will have to visit a CSC to check his/her entitlement to ABY benefits. Once verified through the submission of certain documents like Aadhaar card, ration card or PAN card, the individual will be given a card that can be used at hospitals to avail benefits of the ABY scheme⁴. If this is the case, then the NHS's health ID becomes redundant, if the information within the Beneficiary Identification System (BIS) is usable. Additional information on the success and accuracy of the BIS, as well as details on where and how this data would be stored and under what security standards should be reflected in the paper,.

Each of these factors therefore deepens our concern that the role of the NHS would essentially boil down to providing assistance with pricing risk more efficiently for insurance companies and data portability instead of establishing and complimenting access and delivery of healthcare.

1.2 Security

- Additional information on Health Data Fiduciaries is required
- Informed consent has to be thought through in detail; majority of the population is not digitally literate
- Security precautions must go beyond user consent
- What constitutes a foundational ID? Is it necessary?
- At which point is the data anonymized?

Health Data Fiduciaries play a vital role in the maintaining a secure data repository. The individual can determine the rights to access their "sensitive" information on the PHR through these Health Data Fiduciaries via open APIs. Therefore, it would have been beneficial to mention whether these fiduciaries would be from the government or private bodies as well as the relevant accountability structures that they must follow.

The technical provision for consent, although commendable, assumes a standard level of digital literacy as well as an understanding of consent from individuals. Approximately 40% population in India is living below the poverty line, illiteracy rate is larger than 25-30% and digital

³ Public Health Foundation of India, 'A Critical Assessment of the Health Insurance Models in India', 31st January 2011, available [here](#)

⁴ 'CSC To Register AYushman Bharat Beneficiaries', *Vijay Chowk*, 31st July 2018, available [here](#)

literacy is almost non-existent among more than 90% of India's population⁵. Hence, it must be noted that the NHS will be dealing with people with varying educational backgrounds and the "consent layer" should stray away from being too technical. Each individual should be made aware of the adverse as well as advantageous effects that giving their data would have.

Additionally, data protection in line with human rights and the right to privacy go beyond the notion of consent. There should be measures to prevent the adverse use of personal health data even if consent is given. This becomes a major concern since most people in India only go to a hospital when they are very sick. At that point, they only look for treatment and will consent to almost anything⁶. Accountability structures play a crucial role in this and should be well thought of beforehand.

The paper states that base entry in the beneficiary registry will be created with a link to a strong foundational ID such as the beneficiary's Aadhaar number. It is crucial to question what constitutes a foundational ID and why. Even aadhaar, that is touted to be a fundamental identification has suffered major issues of incorrect information⁷ and data leakages⁸. Additionally, as mentioned above, there might not be a need for a health ID based on foundational IDs if the CSC's are enrolling beneficiaries into the Beneficiary Identification System (BIS). In light of this, the security standards that are going to be used within these CSC's should be chosen in order to prevent data leakages as in the case of aadhaar.

It is worth noting that data anonymization has been given a high priority in the paper and we believe that it is a great step forward towards securing sensitive data. But, the question of when in the process of updating data, is the data anonymized is still unanswered.

The use of open API's open could have potentially harmful effects. There have been instances in the past where sensitive aadhaar data was leaked due to an unsecured API (application programming interface) endpoint. In this case, the API used to access Aadhaar database did not have any limit on the number of requests that can be sent to the database in a particular time frame. This meant that "anyone with the intent to gather data can make a tool to use a permutation of every possible number in the aadhaar number series to automatically sent requests and collect data"⁹. Therefore, certain necessary standards have to be adopted based on learnings from previous cases in order to ensure the safety of sensitive data.

Additionally, numerous questions on accountability could arise due to the fact that it is not clear who operates the stack and at what level. This could have several ramifications, including whether the scope of the technology would be amenable to RTIs.

⁵ Information extracted from the website of Digital Empowerment Foundation, available [here](#)

⁶ Nayantara Narayanan, 'Niti Aayog plan for Aadhaar-linked digital health records raises concerns over safety and privacy', *The Scroll*, 12 July 2018, available [here](#)

⁷ 'Punjab and Haryana High Court pulls up UIDAI for wrong information on Aadhaar card: Indian Express' (*hereinafter* P&H UIDAI), *The Scroll*, 25 March 2018, available [here](#)

⁸ 'Aadhaar Faces Yet Another Data Leak Allowing Access To Personal Data To "ALL" Enrolled In The System: Report', *Tech2*, 24 March 2018, available [here](#)

⁹

<https://www.firstpost.com/tech/news-analysis/aadhaar-faces-yet-another-data-leak-allowing-access-to-personal-data-to-all-enrolled-in-the-system-report-4403621.html>

1.3 Reliance on auto-adjudication technology

- The feasibility of the technology is untested and dubious.
- The scale of the claims processed currently, is much smaller than what is envisaged under the scheme.
- No case-study shows that adoption of this technology has led to better payouts in the government-funded insurance schemes. IRDA indicates that the current payout numbers are good. So what problem does the technology seek to solve?

The health stack proposes to utilize auto-adjudication technology for instantaneous processing of insurance claims. The necessity and feasibility of the technology remain largely untested, and therefore controversial. There are several reasons for this. Firstly, the opponents of this technology point out that the healthcare transaction process contains nuances both from a technology and business perspective, both of which increase the difficulty in the smooth adoption of the technology.¹⁰

Secondly, even in instances where this technology has been successfully adopted, the scale of claims processed is much lower, than what is envisaged under the proposed stack. For instance, in US, Humana Inc., a health insurance company, which has adopted this technology, has a very small fraction of their claims processed by this engine. By the admission of the director of Availity, an auto-adjudication claims engine, most systems currently lack the capability of processing claims in any larger scale.¹¹

Additionally, there do not exist any case-studies, either in India or anywhere in the world which indicate that adoption of this technology in government-sponsored insurance schemes, have yielded better payouts to the service providers, or increased payment assurance. It is interesting to note that IRDA's annual report of 2016-17 show that there has been an increase of 35.16% in the incurred claims in the standalone health insurance sectors. The claims ratio in the health insurance sector has also been high, standing at about 101.05%, indicating a high payout of claims by the insurance companies.¹²

In the face of this, therefore, adoption of the auto-adjudication technology can be warranted only when it can be shown that,

- a. There currently exists flaws within the non-automated, traditional processing of claims in the health insurance sector, which hinder payment assurance.
- b. Adoption of auto-adjudication of claims would solve these supposed flaws.

In absence of any indication of either, therefore, the merits and benefits of the technology remain untested, and therefore, dubious.

¹⁰ Bill Marvin, 'Unveiling the Truth Behind Real-Time Adjudication', *InstaMed*, available [here](#)

¹¹ 'Getting 'Real' about Claims Processing', *InstaMed*, available [here](#)

¹² Insurance Regulatory and Development Authority of India, 'Annual Report 2016-17', available [here](#)

Specific Comments

2.1 Solving Low Enrollment and Participation

a. Concerns with Beneficiary and Provider Registries

- To what extent do family members have access to each other's data and what purpose does it serve?
- If the foundational ID contains low quality data, then the stack will also contain low quality data; what is the need for a foundational ID if the CSC's are enrolling individuals into the BIS?

Under the stack, the proposed beneficiary registry is to have information of family members corresponding to the record of the beneficiary. This raises several, collated concerns. Firstly, the paper does not lay out any scenario where information regarding the beneficiary's family would become useful, or would be a catalyst for better functioning of the engine. Secondly, the scope and nature of the terms 'family' and 'information' also remains undefined, and therefore vague. Thirdly, the scheme does not elaborate upon the consent structures to be put in place to ensure that the privacy of parties is maintained. For example, individuals might not wish to make certain diseases such as their positive HIV status known to other family members in fear of social stigma.

Additionally, the proposed scheme seeks to link the base entry in the registry to a 'strong foundational ID' such as the beneficiary's Aadhaar number. The scope of the term 'foundational ID', however, is not defined. The instance of the Aadhaar number being one such ID is also problematic, inasmuch that such data itself may not be always reliable¹³. If this is the case, quality control of the data should be prioritized since any derivative database might perpetuate the same errors and escalate them depending on their use. In this light, it is crucial to note that there may arise multiple concerns if the NHS mandates aadhaar for the creation of a health ID. Hence, the current scenario in which it is not the only form of foundational ID should be continued¹⁴.

b. Auditing/Quality Control

¹³ P&H UIDAI (n)

¹⁴ Maitri Porecha, 'Aadhaar preferable, not 'must', for Ayushman Bharat: Health Ministry', *BusinessLine*, 12 July 2018, available [here](#)

- Additional information on whether surveyors and updaters are from the government or private bodies is required;
- Otherwise, Health and Wellness centres may run the risk of turning into updating centres, thus, affecting the quality of healthcare

The paper states that "An important element of maintaining provider registries will be the role of a surveyor who will be tasked with physically visiting providers and validating registry data." Additionally, it also mentions that "the source for each attribute in the registry should be visible: viewers should be able to tell who added which information and when. All attributes should be digitally signed by the authorized updater." The acknowledgement of data quality and auditing is a great step forward, but essential questions on whether these surveyors and updaters are from the government or private bodies are yet to be answered.

There is a risk that Health and Wellness centres will essentially work as health data updating centres. This would certainly undermine the quality of healthcare provided given that many of the existing centres do not have utilities such as electricity and water and are being given an effective sum of only Rs. 80,000 via the ABY. Additionally, accountability structures could be set in place beforehand in order to prevent incorrect information from seeping into the NHS database from the beginning itself.

c. Guidelines on Data Utilization

- Guidelines on how data can be used for clinical and non-clinical purposes needs to be discussed
- Lessons to be learnt from the HITECH and HIPAA Acts in the US

Registries will include data for health-sector stakeholders such as healthcare providers (hospitals, clinics, labs etc), beneficiaries, doctors, insurers and ASHAs. Are there specific guidelines for how private sector stakeholders on how they can/should utilize this data to prevent misuse? Additionally, is this data available for non-clinical purposes? If so, how and when and what accountability structures are in place?

The United States had foreseen this issue and implemented the Health Information Technology for Economic and Clinical Health Act (HITECH) and the Health Insurance Portability and Accountability Act of 1996 (HIPAA). It might be worth to see whether these standards can be made better or adapted to the Indian context.

d. Who is it benefiting?

Unless there is assurance regarding the quality of the data, doctors would continue to resort to verifying the dataset against the corresponding physical records, thereby undermining the usefulness of the technology. On the other hand, the data stored would prove to be a tool to price risk better and be therefore useful for insurance companies¹⁵. If this is the case, then the primary benefactors of the technology are ultimately insurance companies, and not healthcare providers or individuals.

e. Is it Solving the Problem in the Right Way?

- Mechanism through which enrollment and participation of beneficiaries and providers will increase is absent
- Increase of health insurance does not necessarily lead to better accessibility and delivery of healthcare (which should be the primary goal)

There does not exist any link between the adoption of the technology and high-enrolment of beneficiaries. Additionally, in accordance to the fact that insurance and a digital infrastructure should supplement delivery of healthcare, the beneficiary and provider registries does not necessarily do that. Even if it increases insurance coverage, there is no reason to believe that this insurance would increase healthcare delivery since the report lacks a comparative analysis on why this scheme was chosen and whether it could lead to better healthcare delivery and accessibility. There still exists no consensus on whether Ayushman Bharat insurance scheme will lead to a healthier India¹⁶. And, if the NHS supplements the Ayushman Bharat, then how does it aim to increase accessibility and delivery of healthcare?

Additionally, a major issue with insurance is that of 'moral hazard' in which patients and healthcare providers have no incentive to control their costs and tend to overuse, resulting in an unsustainable insurance system and cost inflation¹⁷. Any attempt to regulate providers is met with harsh, cost-cutting steps which end up harming patients¹⁸. And cost inflation results in the increase of rejection of claims, thus, harming the patients.

2.2 Poor Fraud Detection

¹⁵ Mohan Jayaraman, 'Has the Insurance industry mastered the art of utilising big data?', *Analytics India Magazine*, 31 July 2015, available [here](#)

¹⁶ Vinod Paul, Abhay Shukla and T. Sundaraman, 'Can Ayushman Bharat make for a healthier India?', *The Hindu*, 13 April 2018, available [here](#)

¹⁷ Sheetal Ranganathan, 'National Health Protection Scheme will not help its intended beneficiaries', *LiveMint*, 15 February 2018, available [here](#)

¹⁸ G. Ananthakrishnan, 'Regulating India's regressive health insurance', *The Hindu*, 11 August 2016, available [here](#)

The paper indicates the use of machine learning for fraud detection, giving rise to two major issues that need to be taken into account:

- a. Historic bias can seep through the training data, leading to harmful and incorrect results.
- b. Some forms of unsupervised learning such as neural networks cannot explain how they came up with their result in a language easily understood by humans which could lead to accountability issues.

2.3 Lack of Reliable and Timely Analytics

- Extent of analytics is vague. It is based on the assumption of good quality data on the stack
- There are no incentive structures for healthcare providers to update records efficiently

The paper's approach towards analytics seems to be vague. It states that the Analytics Framework allows for "horizontal expansibility" to cover, at a later point, disease surveillance, predicting epidemics, classifying and clustering population segments for proactive care, nutrition, health schemes, and national health infrastructures such as telemedicine, teleradiology, and the enhancement of process controls. Each of these tasks that fall under the "horizontal expansibility" requires timely updating of data, which might not be possible. It also requires that the data available at the stack will be of good quality, but in lack of similar precedent, this becomes dubious. Therefore, quality standards have to be considered before jumping the gun to offer these potential services.

Additionally, there seems to be a lack of incentives for healthcare providers and other stakeholders to actively participate in the updating of said data, especially keeping in mind the accuracy of the data. This might, in turn, place additional burden on an already overburdened sector and could compromise on the quality of data as well as the results of analytics.

2.4 Data Portability

- Data portability might not be necessary if the concentration is on the universal access to healthcare
- Are Health and Wellness centres equipped to handle updation of data that is portable?

The main issue with India's healthcare situation is the lack of access to healthcare. A person residing in a remote village would most certainly prefer healthcare delivery in his/her village rather than travelling to the nearby city. Additionally, even if people do travel for healthcare, the practice is to take their physical medical records with them, since they are aware of its importance. The emphasis on data portability is mainly due to the fact that there does not exist an efficient system in which everyone has access to healthcare. Once the focus shifts from using technology needlessly to developing an efficient and universally accessible healthcare delivery system, the need for data portability dramatically reduces. The temptation of digitisation and insurance coverage cannot blind us from the main goal — access to healthcare. If this is the case, data portability should at the best, be seen as a temporary solution until universal access to healthcare in the country is achieved and should not, in any circumstances inhibit it. That being said, it is commendable that NITI Aayog has taken into account the differential impact of healthcare on vulnerable groups such as migrants. Despite this, however, we believe that prioritizing access to healthcare could prove to be more beneficial than data portability.

It is also unclear whether these 'Health and Wellness' centres are equipped with the necessary expertise to record and update health information on illnesses that require more than basic facilities such as X-rays and CT scans. This is exacerbated by the fact that each centre is effectively allocated only Rs. 80,000.



Health stack NITI <healthstackniti@gmail.com>

FW: National Health Stack: UK Inputs

1 message

Himangi.Bhardwaj@fco.gov.uk <Himangi.Bhardwaj@fco.gov.uk>
To: healthstackniti@gmail.com

Wed, Aug 1, 2018 at 6:35 PM

Dear Sir/ Ma'am,

Please find attached UK inputs for India's National Health Stack draft. NHS Digital are keen to join a dialogue on this, in case of interest to you.

I hope this is useful, and I look forward to hearing from you.

Thanks and warm regards,

Himangi



British
High Commission
New Delhi

Dr. Himangi Bhardwaj | Senior Health Adviser | UK Trade, Economics,
& Prosperity

British High Commission | Shantipath | Chanakyapuri | New Delhi -
110021

Tel: +91 (0)11 2419 2386 | Echo: 8414 2386

Mob: +91 9711399859

Email: himangi.bhardwaj@fco.gov.uk

From: Himangi Bhardwaj
Sent: 01 August 2018 18:29
To: 'vinodk.paul@gov.in' <vinodk.paul@gov.in>
Subject: National Health Stack: UK Inputs

Dear Sir,

Greetings and I hope you are doing well. Please find attached, detailed inputs from UK's NHS Digital, on the consultation document on India's National Health Stack. NHS Digital are keen to join a dialogue on this, in

case of interest to you.

I hope this is useful, and I look forward to hearing from you.

Thanks and warm regards,

Himangi



British
High Commission
New Delhi

Dr. Himangi Bhardwaj | Senior Health Adviser | UK Trade, Economics,
& Prosperity

British High Commission | Shantipath | Chanakyapuri | New Delhi -
110021

Tel: +91 (0)11 2419 2386 | Echo: 8414 2386

Mob: +91 9711399859

Email: himangi.bhardwaj@fco.gov.uk

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NITI Ayog National Health Stack Consultation

NHS Digital comments in contribution to UK input: July 2018

Summary

1. NHS Digital has significant knowledge and experience in the majority of areas described in the proposal and as such its comments are based on a proven track record and experience of delivering digital national health infrastructure and products at scale.
2. This proposal appears purposeful, coherent and if successfully delivered could enable wide-scale health reform in India, propelling the country ahead of many other national health systems.
3. Proposed components are broadly consistent with other national e-health infrastructures and the World Healthcare Organisation (WHO) model, including next-step principles and citizen functionality as a core requirement.
4. Further clarity is needed on solution delivery, including whether to explore leveraging existing proven products that could significantly reduce timescales and discovery costs. In this context England's health care portfolio includes:
 - The national Spine, which specifically covers information flows across primary, secondary and tertiary healthcare as described in the proposal and also includes strong access control, audit and consent mechanisms.
 - The Data Services Platform, which provides the capability to support commissioning organisations at regional and national level together with Artificial Intelligence and Machine Learning capability.

High level comments

5. The strategy sets out *what* will be delivered but lacks detail on **how this will be achieved**, including operational detail.
6. Further information is needed on **timescales**, coupled with an assessment of what is realistic to deliver within the given period, referenced only briefly as 2022.
7. Increased clarity on the **budget** is required.
8. **Language** is a confusing and open to interpretation in places, especially in relation to consent and safety.
9. Implementation **support, training and education and system management** must be considered as part of the delivery strategy.

Detail-specific comments

10. Use of multiple **identity numbers** has the potential to cause safety issues and create opportunities for fraud.
11. The proposed ground-up construction provides a clear opportunity to ensure real-time **data analysis** is part of the product, which would bring significant benefit.
12. More clarity is required around **governance**, especially leadership and implementation responsibilities at national, state and local level and how these interrelate.
13. It is not clear how the **Personal Health Record (PHR)** relates to the insurance-based record and how a single source of truth will be ensured.
14. Based on our experience in England regarding **enabling functionality**, it is imperative to understand requirements around security, confidentiality (privacy by design), message-handling and audit trails.
15. Understanding **non-functional requirements** including volume, performance, reliability and support is vital.
16. More detail is needed on **standards**, which must be developed, profiled, distributed, assured, maintained and supported, in some instances globally (such as SNOMED and HL7) but in some instances nationally (such as for healthcare providers).

For information

17. Working with Healthcare UK and trusted partners, NHS Digital has the necessary depth of experience and skills to assist the Indian Government with its proposed product, which would significantly reduce delivery timescales.
18. Alternatively, there may be the potential to explore, through government-to-government dialogue, possible use of NHS Digital intellectual property from which to build the new product.

ENDS



Health stack NITI <healthstackniti@gmail.com>

NASSCOM-DSCI Response: National Health Stack Scheme

1 message

Anand Krishnan (DSCI) <anand.krishnan@dsci.in>

Wed, Aug 1, 2018 at 5:43 PM

To: "healthstackniti@gmail.com" <healthstackniti@gmail.com>

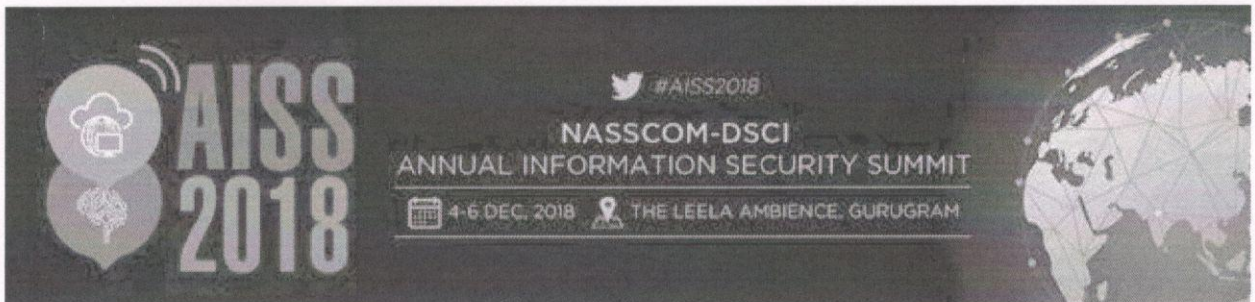
Cc: "Ashish Aggarwal (NASSCOM)" <Asaggarwal@nasscom.in>, "Vinayak Godse (DSCI)" <Vinayak.Godse@dsci.in>

Dear Madam/Sir,

Please find attached the NASSCOM-DSCI submission to the National Health Stack Scheme consultation paper.

I would like to thank NITI Aayog for providing this opportunity for stakeholder consultation.

We would be happy to elaborate our submission, if need.

Best Regards,**Anand Krishnan | Senior Analyst-Policy****DATA SECURITY COUNCIL OF INDIA (DSCI) | A NASSCOM® Initiative****P: +91-120-4990257 | M: +91-9910493064 | E: anand.krishnan@dsci.in | www.dsci.in**

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NASSCOM-DSCI Response: National Health Stack Scheme

Overall Submission

NASSCOM and DSCI and its Industry members firmly believe that the digital economy should primarily aim to benefit citizens. The technology sector is fully supportive as the growth and proliferation of Information and Digital technologies is linked to citizen's feeling safe, secure and assured in the digital environment. Healthcare is the backbone of any country, impacting economic, political, social and environmental prosperity. While urbanization, rise in disposable income, and privatisation and digitization of public health institutions and players has improved healthcare in India, the statistics still indicate that there is a long way to go.

In comparison to other BRIC countries, India has higher incidence of communicable diseases like Tuberculosis, at the same time higher mortality rate for NCDs like heart diseases and cancers.¹ Out-of-pocket expenditure is a whopping 62% of total expenditure, but availability of skilled health professionals is the lowest.² In fact, the current bed capacity (2015) of 1.5 million is only 47% of the required bed capacity as per WHO standards and only 30% of the desired bed capacity of 5.2 million.³

The use of technology may emerge to be instrumental in providing medical services in remote rural areas and to a population with low level of income in Indian context. The NHS proposed stack strategy as envisaged is an imperative step in this direction in which technology usage and building a standard delivery of architecture will be the primary bedrocks of the healthcare delivery.

Structured medical national system is critical for providing right medical care and innovation in the healthcare industry. We recommend a comprehensive study of global health programs and state health care models to establish best practices while creating the final strategy and approach paper for the national health stack scheme.

It is requested that the Niti Aayog takes below suggestions into consideration and undertake comprehensive stakeholder consultation to finalize the strategy.

¹ Mortality rate attributed to non-communicable diseases such as cardiovascular disease, cancer, diabetes or chronic respiratory disease (Probability of dying from any of cardiovascular disease, cancer, diabetes, chronic respiratory disease between age 30 and exact age 70 (%), 2015); 2. Figures shown for skilled health professionals refer to the latest available values (2005–2015) given in WHO Global Health Workforce Statistics, 2016 update)

² NASSCOM Report: Healthtech in India, Are we there yet? (2017), page 11.

³ *Ibid.*

Specific Comments

1. **Clear demarcation of scope of application:** At present, it is not clear if the national health stack has been created to facilitate the “*Ayushman Bharat Yojana*” project and other government health programs alone or has the health stack been envisioned to subsume all health care services in India.
2. **Decoupled model of governance:** There should be an independent regulatory body for oversight, separate from the central database entity under the national health stack scheme. This is essential to establish a system of checks and balances. The NHS design should not imagine itself to be restricted to one operator managing the database. It should allow for multiple operators with the ability to access and port data from each other. This should be done in a manner so that the interest of the operators are aligned to those of the users and the design fosters competitive efficiency and innovation.
3. **Administrative framework at a national level for interaction with state level data -** There is no mention of how the geographical architecture of a state level subject will interact with national level system. A specific example is the question of Inter-state portability for cashless treatment when patient might require hospitalization when out of their home state. This design principle needs consideration in the architecture of national health stack.
4. **Fostering an environment for innovation:** The objectives mentioned in the national health care stack strategy are characterized with keyword such as open APIs, open data policy and data sharing. It is encouraging to see government taking a lead in defining future national system with inclusion of contemporary digitization practices. But at the same time other laws proposed by ministry of health is emerging out to be regressive in nature. For example, ‘The blanket restriction in Section 29(5) of DISHA Act on usage of both identifiable and anonymized data for commercial purposes is excessively restrictive.’⁴ There should be an option for using such data with the informed consent of the end user as well as allowing the use of ‘anonymised’ or ‘de-identified information’. Not using the identifiable or anonymized digital health data for commercial purpose it may kill all possibilities of innovations along with the business model of the several existing Digital Service Providers. Hence it is requested of NITI Aayog to conduct a consultation exercise with ministry of health and apprise them about healthcare digitization evolution, so that they may not adopt data protection measures which may result in stifling innovations and emergence of new use cases.

⁴ Section 29 (5), Draft Digital Information Security Act.

- 5. Role of Private Sector Organisations:** The role of private sector as a leading partner in building a national health stack has not been elaborated. Private sector (user organizations such as hospitals, clinics, path labs etc.) in India is emerging as a major player with w.r.t adoption of changing digitization paradigm. This includes hospitals, e-Pharmacists, health insurance providers, e-nursing, aggregators etc. These players in their systems are adopting digitization practices such as providing digital health ids, tele-medicine, robotic surgeries, instant health care insurance claims, healthcare data portability and real time fraud management etc. Whether using an IoT solution for post-operative care, drones to deliver blood for transfusions to remote areas, or artificial Intelligence-powered systems to detect heart disease risk –technology in healthcare as adopted by the private sector aggressively has immense potential in improving healthcare access, quality, and reducing costs. Hence the national health care stack warrants to be architected with consideration given to; integration of private players systems with it and not restricted only to government health care institutions and providers.

Each industry sector including healthcare needs to provide level playing field with inclusion of stakeholders such as private sector and academia. Creation of a system where the government enters the market as competing player, while acting as a gatekeeper for the other players is to be guarded against.

Examples of private sector use cases for health care services⁵:

- a. Investing in a platform business model, working with its cloud partners. Objective is to connect patients, devices, platform, sensors, using Medical IoT (Connected Health) to seamlessly expand the care continuum from hospitals to home.
- b. Big data analytics for Genomics used by universities have been able to scan through data-sets to identify treatment and clinical trial options for 1,000+ patients that had tumours with genetic abnormality. The study indicates that AI can be used by physicians to determine appropriate treatment options.
- c. Solutions adoption for eSourcing, Monitoring and Patient Engagement in clinical trials, for pharma, biotech and med device companies.
- d. Develops patient specific 3D printed organs using proprietary software algorithm

6. Dependency on one national health ID:

The system as conceptualize is planned to be architected with one single digital health ID which is to be provided by the government to the citizens of India. Confinement of the health stack to one digital health ID, issued by the government, may negate ongoing discovery of use cases and technology experimentations. These experimentations are evolving in such a way that any identifier may become a digital health ID e.g. mobile number, social media ids etc. Hence, there should be flexibility for introduction identifiers as digital health IDs. This will not only make system more open, but also will help on-board the larger set of population in a short span of time.

⁵ NASSCOM Report: Healthtech in India, Are we there yet? (2017).

7. **Disconnected Health Registries:** The Central Bureau of Health Intelligence already manages the National Health Resource Repository. Similarly, Ministry of Health and Family Welfare manages National Identification Number (NIN) for all Health Facilities of India. There is Registry of Hospitals in Network of Insurance which has been developed by Insurance Information Bureau of India. These are disconnected efforts. NHS should triangulate with all these registries and subsume all information under its own master data.
8. **Limitation of Consent Based System in Inclusive Systems:** One of the fundamental concerns associated with the NHS is, the usage of consent as a ground for providing services to citizens that belong to the economically weaker, deprived and most vulnerable sections of the society. The paper with respect to privacy and security considerations puts the onus on individuals through consent. It is important the paper acknowledges the need to facilitate informed consent as advocated by the Justice BN Srikrishna committee report.⁶ And, while stating that the individual is the controller of her data as a foundational principle, the paper should specifically mention that consent doesn't transfer/absolve accountability.
9. **Centralized architecture goes against the contemporary trend of distributed computing:**

Prima-facie as per overall block diagram architecture of national health stack in seems largely rely on centralized architecture. This not aligning increasing trends towards decentralization aka blockchain. The blockchain technology have provided an alternate mechanism to architect national systems with a novel decentralized philosophy and technology measures. Hence restricting system building approach to be based on centralization may not benefit the healthcare sector from efficiency, resiliency and data protection aspect. The architectural centralization may also attract attention of cyber adversaries and security researchers for exploitation of system; as central systems are prone to carry additional risks as compared to the decentralized systems.

Example⁷

Healthcare organizations found in recent IBM study rallies for blockchain: Keeping the patients at the centre, are similar to life sciences in their belief that blockchain will positively impact imperfect information. In both these industries, much patient and clinical data is digitized, but regulations keep organizations from sharing data, and the lack of interoperability standards adds friction to the exchange of information. In addition, shared data is often not trusted due to incomplete information or errors from multiple manual re-entries. On a blockchain platform, however, as trust in the data becomes "embedded in each transaction," institutions can reconsider these boundaries

⁶ A Free and Fair Digital Economy Protecting Privacy, Empowering Indians, Committee of Experts under the Chairmanship of Justice B.N. Srikrishna, (2018) page 36. Available at: http://www.meity.gov.in/writereaddata/files/Data_Protection_Committee_Report-comp.pdf Last accessed 31st July 2018.

⁷ Treshock, M. and Treshock, M. (2018). *First Mover advantage: Innovation through blockchain - Blockchain Unleashed: IBM Blockchain Blog*. [online] Blockchain Unleashed: IBM Blockchain Blog. Available at: <https://www.ibm.com/blogs/blockchain/2018/06/first-mover-advantage-innovation-through-blockchain/> Last accessed 1 Aug. 2018.

— such as the boundaries between payers and providers in the case of healthcare, or the boundaries between pharmaceutical manufacturers and the end-consumer in the case of life sciences — bringing significant disruption to the respective industries. With this disruption comes opportunity, and many organizations are exploring, testing and implementing blockchain to help them adapt — setting a fast pace and charting a direction for early advantage.

10. Challenges with external ecosystem interaction: Large health care centralized databases of biometric Personal Identifiable Information, linked with networks and made searchable in a distributed manner, represent significant targets for hackers and other malicious entities to exploit. The other health care registrars and the agencies which will capture or use the data APIs and store the same even as they transmit the same to central health system, that may turn out to be the weakest link when it comes to the security and privacy, as enforcing same level of security practices on third parties or external systems is an arduous task.

11. Architectural Conflicting Requirements:

The report postulates that there has to be minimal changes to the different health record format existing in different places and sources of NHS; this may act as a caveat to manage heterogeneous information to be aggregated from multiple sources. Though this may not emerge as a significant challenge in the age of machine learning and big data analytics, still to be noted till machine learning reaches the epitome of commoditization in the healthcare.

12. Ethics and Anonymization in Analytics:

Current proposal of NHS stack is silent on how it may tackle the issue of discrimination of any category while approving claims. A system which is automated may include hidden biased configurations leading to frauds in the system. NHS stack may include guidelines on how the system plans to deliver a non-biased system. One of the NHS stack strategy objective is to detect insurance claim frauds e.g. irrelevant/unnecessary or medical tests conducted etc. While conducting granular health analytics, how the system plans to keep the patient data anonymized is not lucid. In case of broader or granular health data analytics operations – detecting disease spread as per cities etc., the data is recommended to be anonymized. There needs be a feedback mechanism built in to tackle these conflicts.

13. Incentives for Ecosystem Players:

Incentives have to be designed for medical practitioners, insurance industry as well as public health staff to improve the health data and be part of national healthcare stack. Technology can at best streamline processes and help create a digital backbone for public health.

14. Self-Maintainability:

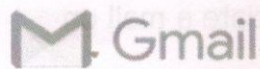
The NHS envisages self-maintainability as a design principle where entities listed in the registry can update their information in a verifiable manner. This may prove to be difficult for the beneficiaries as well as small medical practitioners who either do not have state of the art digital infrastructure, or digital literacy to integrate with national health stack.

15. Conflict Resolution in APIs:

NHS allows multiple entities (e.g. hospital systems, health technology companies) to manage health data about users. While open APIs will facilitate this communication, it is not lucid what may happen in case of conflicts while leveraging data and the system.

Way Forward for National Health Stack

- Formulate and enforce robust cyber security guidelines for third parties who are either collecting, processing, storing health care data or leveraging it for their business operations via API integrations as planned in future.
- Encourage or enforce central and state government departments to assess their cyber security posture, especially where it involves collecting, processing, storing healthcare data.
- Onboarding of the health care applications should be go through prior check. This should include security testing of application, privacy impact assessment and configuration hardening checks.
- Strong enforcement of privacy guidelines for end to end healthcare ecosystem which should also take care of fundamental right of 'Right to Privacy' for an end citizen and conform to data protection regulation
- Building backup methods or adopt decentralized system building approach which can act as a way out in case few instances of national health stack is not functioning or available.
- Subject national health care stack ecosystem which includes third parties' environments to rigorous regular assessments and audits.
- Special attention needs to be given on interfaces, external connections and environments participating in the executing health service transactions for to curb the possibilities of data breaches.
- Devices, interfaces, systems and even algorithms participating in processing of health services transactions should have security strengths to withstand with the possible threats.
- Security, privacy and fraud management should be based be leveraging the global experiences, as nature incidents and frauds are global in nature. Systems are likely to subject to threats experienced in any corner of the worlds in a short span of time.
- Dealing of the health stack with the external world, security experts and researchers should be professional, progressive and engaging.
- Security and governance function should match to the quantum and complexity of challenges. Learn from global cyber security practices to address complex problem statements and to make security and governance more forward leaning
- National health stack will be subjected to advanced and targeted attacks for a variety of reasons. Being key enabler of digitization, it may attract attention of state and non-state actors.
- Collaboration, learning from others, making system open for scrutiny, extensive security testing, provoking innovation to address unique use cases and even going to the extent of bug bounty should be the key strategies for securing systems.



Health stack NITI <healthstackniti@gmail.com>

Regarding Comments Invited for Creation of National Health Stack

1 message

G Venkatramani <gv@truhealthkare.com>

Wed, Aug 1, 2018 at 12:56 PM

To: "healthstackniti@gmail.com" <healthstackniti@gmail.com>

Cc: "truhealthkare@gmail.com" <truhealthkare@gmail.com>

Dear All at NITI Aayog

As you have stated , The National Health Stack (NHS) envisages a centralized health record for all citizens of the country in order to streamline the health information and facilitate effective management of the same.

We at TruHealthkare have been pursuing similar goals with a similar vision for transformational Healthcare and have been working to create this disruptive change for 3years now.

So when this Consultative Paper was put up , we were pleasantly overjoyed as it is exactly what we were planning . Also while we were creating this ,we realised it has several things close to the heart of our beloved Prime Minister.

As we have explained in our Document , ours is a Made in India Product for the World , as the solution we have invented, will solve several of the Technology problems in Health DATA.

It leverages on DIGITAL INDIA , and it is the Digital Healthcare solution for India and the world.

The training that can be given via our DIGITAL SOLUTION is another extension for SKILL INDIA.

All in all , we feel that the solutions we are proposing is of IDEAS WHOSE TIME HAS COME ,ever since organised Medical Recordings began in the early 19th Century.

We present to you attached ,our Solutions for a Futuristic DIGITAL NATIONAL HEALTH STACK and look forward to a constructive Dialogue and Partnership in achieving this vision.

We look forward to your Comments and Response and would also appreciate a mail on the way forward/process in the development of this approach.

THANKING YOU,

Yours Sincerely

G. Venkatramani,M.Sc Physics(Delhi),MBA(IIM Ahmedabad)

CHIEF VISIONARY OFFICER & FOUNDER

TRUHEALTHKARE PHS LLP

Handphone: +91 7021348144 ,9702125578 , 9930006211

TELEFAX:+912225898455

C-2 / 603&703 ,VALLEY TOWERS,GLADY ALWARES ROAD,OPP DMART,THANE(WEST)400610

www.linkedin.com/in/gvenkatramani

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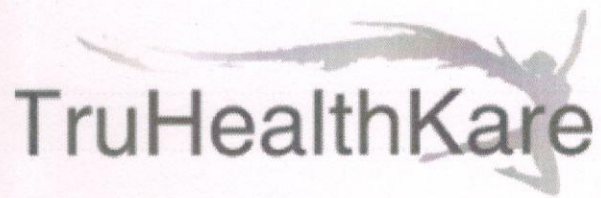
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NATIONAL HEALTH STACK

NITI AAYOG

AUGUST 2018

TRUHEALTHKARE PREVENTIVE HEALTH SERVICES LLP

THK@TruHealthKare.com

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WHO ARE WE?

TruHealthKare (THK) was born with a Utopian vision of ushering in True Healthcare vis-à-vis the sickcare that is actually being delivered in the name of Healthcare, at the intersection of ever-rising costs and the introduction of disruptive digital innovations.

Behind this vision is the core team^(Annexure 1) comprising of professionals in Medicine, Sales and General Management, with over three decades of experience in conceptualising and executing Developmental Projects in Education and Healthcare.

BRIEF HISTORY

THK had put up the need for an Electronic Medical recording module as part of an Integrated Developmental Project submitted to NABARD in 2007. One of our co-founders was part of a successful General, Gynaecology and Paediatrics practice in Mumbai for over 3 decades, comprising 2 maternity and surgical hospitals and 5 clinics managed by 2 doctors solely on the strength of meticulously kept albeit handwritten records, a practice which is not prevalent in today's generation of Indian Medical Practitioners*.

WHAT DOCTORS NEED

The productivity gains of an EMR alone should justify the art of systematic use of computers today in a country whose doctor / patient ratio needs to be improved. These gains have to be augmented through design to overcome the resistance of the medical profession who see it as a distraction from patient care and Medical decision making. They experience the task of typing in a record as avoidable parts of a Data Entry function which should be farmed out**.

Doctors will benefit from live data thrown up while recording, especially if tied to different modes of Medical decision making. This could be vital to a Doctor whilst seeing a patient. However EMRs traditionally offer only a selection of forms by which he will record patient data rather than offering a selection of meaningful Medical data for the Physician to select. As we will see below, this design is a creation that stems out of pure Administrative and Commercial considerations in the History of EMRs.

**Level 1: Non-electronic data - non use of IT to share information (Private practitioners keep diagnostic and a few brief notes on the prescription paper)*

***Level 2: Machine transportable data - transmission of non-standardized information via basic IT fax or personal computer [PC]-based exchange of scanned documents, pictures. Can include Doctor inputted text shared through pdf files*

RESPONSE TO THE NHS AND NITI AAYOG

THK has had a chance to study the Consultation paper on the proposed National Health Stack, put together by NITI Aayog.

The key elements of the NHS mirror our own thinking on the subject that has evolved over time and even to the extent of using Insurance as a stakeholder and a change agent which has been much more eloquently designed in the National Health Stack.

THK agrees that the way forward to proactive, preventive healthcare and to ensure Universal Health Coverage is DIGITAL. While the Objectives are exemplary, we wish to bring clarity on why these objectives need to be serviced in an optimal way and how they tie in with the different levels of interoperability, so necessary in the Design of a Digital Stack. To illustrate this, we have used as a device, a paper by Walker et al ^(Annexure 2), to define a standard, necessary for India.

This paper and analysis given below allows us to illustrate, how choices made in the Developed world have created the high cost of the Health Information Exchange Models.

Basis which, we now know that despite billions being spent, inadequately implemented data standards have choked Medical information flow and that has led to high healthcare costs with avoidable impact on morbidity and mortality.

As a Nation we need to learn from the above experiences in the developed world and focus on what will work for us.

We need an **interoperable and integrated patient record in which all healthcare providers can participate, within a framework providing governance, authorisation and security measures**. Exactly as envisaged in the proposed *National Health Stack*.

We, in India, need to use the ^{Annexure 2} Level 4 interoperability, or 'machine interpretable data' as a basis for true interoperability. We have added to this, THK's understanding of Indian conditions, to create a design that works for us. This is under implementation and will be critical to both, the Indian healthcare architecture and to the 'Make in India' Campaign (A Product /Standard Made in India for the World).

A REVIEW OF CURRENT PROBLEMS OF MEDICAL RECORDING IN THE DEVELOPED WORLD

We have studied the Domain of Medical Recording of information in the Developed world in great Detail over the last 3 years and consulted a fair library of reports, opinions and practices. We found that in the absence of prescribed data standards, the mandatory Health Recordings have in the West created voluminous Data Silos, which can in no way be called interoperable.

We have reviewed systems and technologies, both Open Source built by collaborative global efforts, and Proprietary by Global players. We have traversed the orbits of development in Europe and US before designing our soon to be 'patented approach' of the **"Complete Digital Recording System" (CDRS)** of machine-readable medical data.

The current practice around the world is that the majority of vendors of EMRs are competing to build the greatest and 'best of breed' clinical software applications, but all are doing it in their own proprietary way. Their meticulously designed systems are composed of 'Forms' or

'Templates' that have some selections of interoperable data of 'Terminologies' like the ICD 10 or SNOMED etc., but are mostly constituted by entered text (non standardised data).

Current EMR applications are typically form or template based and use a static user interface (UI). Thus most EHRs opt conveniently to use only on a subset of completely digital data, letting the rest be recorded as free text.

Their application software EMR are characterised with a rich functionality, based on Client need and a great user interface. They are designed to do a great job in the clinic, hospital or network on which they are installed. How can they then share largely system defined text based clinical data?

Some EMRs may be able to share data with the same system in another geographical location because they share a common data structure, but are at a loss to easily share data with the system of another vendor. Walker et al^(Annexure 2) call it:

Level 3: Machine-organizable data—transmission of structured messages containing nonstandardized data

To compound matters, instead of focusing on the primary goal of efficiently recording clinical and confirmatory data, EHRs have been designed and used

- To contribute to hospital or practice management services,
- To justify the Insurance or Billing services that are tied to Health Care.
- Therefore capturing only that health data/diagnostics etc. which results in getting doctors or hospitals paid.

Hence, EHRs neglect much of the **essential clinical record** which needs to be captured. If captured, the EHR generally allows for it to be **stored largely as text**. If it is text, it is not standardised or not machine readable and poses difficulty for analysis, thus depriving the Health user or system of its primary benefit.

We debated on why a world with so many open standards of machine readable data stayed away from solving the problem of non-standardised data or textual data in Health Recording. Our analyses showed that many workarounds were accommodated as a commercial need to protect precious turf and not a true solution to the problem of interoperability².

The US market in particular had really leapfrogged in size and scale largely due to executive actions initiated by President Bush and carried forward by President Obama's Obamacare. These actions had been given an impetus through a carrot and stick approach; by way of strong incentives to Computerise Health Recordings through EMR/EHRs and disincentives for non-compliance. But the choice of system and the data structure was still individually decided.

And, while the size and scale of the industry grew by leaps and bounds, the core inner function of the fully and efficiently capturing the medical data was ignored in the record bound to the application software. Sharing the EHR was not also the focus.

It is too expensive to jettison the petabytes of data captured through forms, largely as text, in different ways by different EMRs. So a working solution has been developed - namely the use of a messaging standard like HL7, FHIR or a modelling/archetype model like OpenEHR. These do not seek to change the data itself (largely textual) that is captured but define what that data means and how it could be shared.

Those practices can persist in India too if we allow ourselves to blur the boundaries and confuse the software program or EMR with the data it contains or the Electronic Health Record. In fact in the USA the word EHR has largely come to mean a clinical application. It is pertinent to note that it is **not the application, but rather the data**, or health information, which makes up the health record. It is only if this Health Record is defined strictly and is part of a common and globally agreed structure, that the Electronic Health Record is shareable and can be put to use.

In today's dynamically changing world, we need, Shared Electronic Health Records (SEHRs) to provide timely, comprehensive and coordinated healthcare. In order to support interoperability of health information, SEHRs need the data in the clinical content to be standardised. How the application and the software is designed and service a particular client's need could still remain in the domain of the EMR companies.

In order for two clinical systems to be able to share health data unambiguously, more is required. This semantic, or knowledge-level interoperability is based on a common and coherent clinical model.

When this clinical content structure is agreed at a local, regional, national or international level, true semantic interoperability can occur at each of these levels.

According to Walker et al^(Annexure 2), Semantic interoperability means Level 4 interoperability or '**machine interpretable data**', which comprises both **structured messages and standardised content/coded data**. In practice, it means that data can be transmitted and viewed by clinical systems **without the need for further interpretation or translation**.

How this data is displayed is another matter. The same data can easily be programmed to use different languages as in India or have preferred medical terms as prevalent in countries or even regions. This is only possible if the data in its core is Machine interpretable.

Current clinical EMR applications can usually send or receive point-to-point messages using a format which is known and agreed, and based on a standard such as the Health Level 7 (HL7) version 3. The software may also incorporate a Terminology to assist in capturing and storing common clinical concepts.

There is a common misconception that if we simply have a 'Messaging standard' paired with a 'Terminology', or for that matter with a message wrap like FHIR or archetype model like OpenEHR then we have 'achieved true interoperability'.

For clarity, existing HL7 v3 or even FHIR or OpenEHR models and messages probably fit into Level 3 of Walker et al's^(Annexure 2) conceptual framework – 'Machine organisable data' which comprises structured messages but **unstructured content**.

A change in this unstructured content of data and architecture would enable the move for standardised data communication of complex health information between distinct systems. It would allow for the opening of our current vertical domain and organizational silos, allowing accurate and semantically computable health information to flow.

It is thus a **mystery why we complicate our current EMRs or clinical applications** when it is more elegant to capture and **transform just the data into an interoperable electronic**

health record (EHR). Even more so as we realise that the modern experience of healthcare delivery is evolving and changing at an unrecognisable pace due to changing needs like these:

- advances in medicare and line of treatment
- hospital in the home projects
- supported self-management
- patient requests for access to GP and hospital clinical records
- personal health records
- service coordination
- clinical care plans
- preventive health priorities

So essentially, the world at large is living with variegated systems in Medical Records with two major imperfections - the data is not fully recorded as is needed, partially recorded digitally and as such is not truly interoperable.

THK'S SOLUTION TO THESE PROBLEMS

A True solution for the above problem would require the creation of a Complete Digital Recording System (CDRS), which has in its core a superset of data for recording. This Data needs to be machine interpretable, and have a medical vocabulary of a million plus elements/ideas of Globally accepted standards. When the CDRS is used for recording codified machine interpretable health information of a Health User, it would produce what we like to call as a Complete Digital Health Record (CDHR). These CDHRs are created using the CDRS and so are inherently interoperable. This calls for a HUGE shift in the way current EHRs are put together.

A million plus machine readable record is necessitated because any kind of Medical problems can present to any type of doctor regardless of his or her specialisation. This huge superset of data of course poses a mammoth problem,, as there exists no magical classification or incremental iteration in the design of current EHRs, to tackle this.

The THK EHR now called the CDHR, needed re-envisioning, redesigning, especially the architecture in which they are placed, without the need to disturb the capabilities of EMR that understands Client needs so well.

Therefore, the key Design Parameters for us to create the THK **CDRS** system were:

- to be 100% (or as close to 100%) Digital and
- fully semantically interoperable

To input the information into the patient record, a **DocApp** has been created to efficiently use the CDRS. It has been conceptualised to take inputs in many forms: voice, text, touch, handwritten notes etc. and create a process flow that the Clinician will use to record information thoroughly.

The design includes algorithms with domain intelligence built into its operational use to drastically reduce the doctor's effort and even partner him in his recording of the CDHR. The DocApp creates a process based UI which follows the physician's workflow, allowing for greater acceptance and even need of EHR solutions. Done in an intuitively guided way, it will give the freedom to record the clinical information in multiple ways reflecting the individual logical working style or preference of the Medical Practitioner.

We envisage a very important usage for our DocApp in Ayushman Bharat, the flagship project to provide coverage to 40% of BPL families. The delivery is proposed to be strengthened by the building of 1.5 lakh health and wellness centres offering preventive and primary care. The DocApp would allow the centres to be inter-linked and offer Continuity of Care seamlessly from the PHC to the District Hospital and thereon. The details logged into the patient's CDHR, would also validate insurance claims if private Hospitals are used. It can also be used to validate the Provider Doctor's / Clinic / Nursing Home / Hospital details in the Registry and would enable the Insurance stack to audit minutest details including medicines, tests done etc.

INDIA AND...THE COMPLETE DIGITAL RECORDING SYSTEM (CDRS)

Even more important to us in India is the fact that we are on the cusp of a National focus on Connectivity and a subsequent unbundling of Digital India. Technologically, **Moore's law** now allows the million plus ideas comprising Medical Data to be carried even in a Handheld device which finally has just enough memory and processing power to handle the task.

This has allowed us at TruHealthKare to test and implement the **CDRS** as a fully Machine readable and interpretable interoperable system with Data which can even be made to **function in an offline** mode.

We will of course create a Cloud service using the CDRS. There it would not only service Indian healthcare users and institutions from the registries, but also serve as a repository to digitise and make fully interoperable legacy data from India.

India can then generate services to deliver the benefits of true interoperability by converting currently generated EHR into machine interpretable data for Global needs of an increasingly efficient and cost conscious world. The Market for Services to port the existing non machine readable data into the above CDRS format itself can, we feel, fund a new digital surge in an economy well tuned to profit from it.

Eventually it will lead to **THK method and record becoming a global standard**, and THK has now chosen to create a new nomenclature; choosing to call its record as the **Complete Digital Health Record or CDHR**.

CDHR is a completely Digital **holistic patient** Record and is also Complete as it records any and every interaction with the Medicare system (literally from Womb to Tomb), in a way that is amenable to the Data being freely interoperable and subject to Data Analytics and Machine learning, leading to better outcomes and complete Continuity of Care. *As is envisaged in the National Health Stack (whilst we examine Product and Process Patents - CDRS as Process and CDHR as the Product).*

The **CDHR** is designed to be linked to a **unique identifier** like the Aadhar or the Social Security in the US (for a reference).

It is created by using the DocApp to ensure that the UI does not make recording from such a huge superset of over a million medical elements cumbersome. It was achieved by creating our **process focussed UI**, which supports and works in tandem with the differing ways that physicians capture relevant information **at the stage of creating the record itself**.

Once the patient record is created, **the Baseline legacy record** can also be created by inserting digitised older paper records, images, scans, test reports, prior consultation records, etc. so that

in the limited time that the Clinician sees the patient, he is upto speed on his customised dashboard on the patient's Health parameters.

The near 100% CDHR has many spinoffs. It

- makes Data repositories redundant making countries like ours, that have not created/invested in them, leapfrog a generation
- sits snugly in the cloud and is anytime , anywhere accessible
- is inter-operable across any and every Healthcare system in the world
- can be subjected to Data Analytics and machine learning which will give it an AWACS like capability at a later date.
- is portable across the entire spectrum of care-be it primary, secondary, tertiary, pharmacy, laboratory, radiology etc...providing effective continuum of care as rightly envisaged in the proposed Health Stack

The Superset of data, that the **CDRS** provides on handhelds, enables the way forward to proactive, preventive healthcare, by being omnipresent to ensure that Indian Universal Health Coverage is inherently DIGITAL as expressed by the NITI AAYOG. We feel strongly that India could now have unique opportunity to effect a Paradigm Shift and take a generational leap if it can generate, primarily machine readable and interoperable data even in remote PHC visits.

THK's initial focus is India, and the design we envisage also contributes to solving some of the unique problems of Primary Care in India. The number of MBBS Doctors coming into General Practice is declining rapidly due to the trend of specialisations and super-specialisations. The new General Practitioners across Rurban areas are generally non MBBS, AYUSH or even RMP practitioners who also practice modern medicine.

Given the challenges in Medical Record Keeping in the Indian context and the absence of strong malpractice laws, pushing through effective Electronic Medical Recording should be really difficult. However, if the **CDHR** is designed to meet the essential needs of each stakeholder, the picture regarding implementation changes significantly.

- Modern Medicine Practitioners including AYUSH that make up the majority of the Rurban GPs, would appreciate the support given by the DocApp during the history and clinical examination process that might ensure that nothing is missed in the systematic approach involved in recording the CDHR.
- The medical algorithms of Modern Medicine incorporated into the **DocApp** can direct the physician's attention to explore clinical possibilities and point towards investigations, if needed for a comprehensive CDHR.
- To also have the ability to display a differential diagnosis and then reach the final diagnosis and have the **CDHR** display through the DocApp, the rational and standard prescriptions for the diagnosis, could make doctors function in a more cost-effective way.
- The Consumer of Health services is thus benefited as the gap between modern medicine and AYUSH narrows down with respect to the practice of modern medicine. Now, though any doctor can still make errors, the systematic prompts during the process of clinical examination and recording the CDHR, would reduce the possibilities of diagnostic error and replicate the disciplined process that is taught in Medical colleges and is part of the regimen of arriving at a diagnosis in Modern Medicine.

Thus in THKs interactions with AYUSH Physicians, the question is never why such a **CDHR**, but when will it be available.

This we feel is a basic foundation for a truly shareable EHR and for functionality such as clinical decision support.

- This would also make the **CDHR and DocApp** valuable to Medical Students studying Modern Medicine that need to learn a systematic disciplined process during their clinical rounds and also need to record their findings leading to a diagnosis before presenting it to their teachers
- The interaction with this student group was encouraging and it will also allow for familiarisation of the working of the **CDHR** as they graduate
- It is also designed keeping the **HEALTH USER** central to the **CDHR** and presents many advantages to the User
- These start from having a secure record displayed in his language, on the cloud owned by the Health User/Patient, who allows privilege to any GP or consultant to add to the record (as envisaged in the NHS) as displayed in the usual Medical format
- A CDHR means a complete history and convenient medical summary as well as past and current investigations and treatment now travel with the user to any doctor, obviating the need for duplication of investigation or wastage of the doctors time (as envisaged in the NHS)

This sums up our vision of a **Digital India in Healthcare**, a coherent plan to leapfrog a generation and lead the world in how to most profitably apply open source information.

The Digital route, we concur will leverage the India Stack and create the NHS with its own unique ecosystem of Registries, Linking Insurance and a Personal Health Record. To succeed in our goal we will need to meet the challenges of medical recording and storage, and, we can **build it right by design from inception** as a **CDHR**, an almost 100% Digital record.

It should display in all languages, anytime, anywhere, recording everything, and communicating with all existing systems, including those from states that might have invested in as part of Public Healthcare efforts, without expensive hardware or software recalibrations.

We feel this seamless flow of communication across the NHS eco-system is the key to translate this vision of a Personal Health Record for everyone by 2022 into reality.

We invite your views and thought on the subject.

OUR CONTACTS

If you have any queries and need more information, our contact details are:

G. Venkatramani (Chief Visionary Officer / Founder)

gv@truhealthkare.com ; 91 70213 48144

Dr Prashant Azad (CTO / Domain Specialist / Co Founder)

pa@truhealthkare.com ; 91 94227 55365

TruHealthKare Preventive Health Services LLP

C2/703, Valley Towers, Glady Alwares Road, Thane 400610, INDIA

- Psychiatrists, Psychologists, Physio/Occupational therapists and Medical and Psychiatric Social Workers.
- C.A.R.E. invited Psychiatrist and Institutional Heads from Ireland, England and the U.S., who trained and supervised the above. C.A.R.E. was also selected by S.N.D.T. University for training of their Post Graduate students.
- Direct Services offered at The Clinic attached to C.A.R.E., included:
 - Psychotherapy Services(Individual and Family Therapy)
 - Child Guidance Clinic
 - Learning Disability and Remedial Education
 - Drug Abuse Prevention
 - Sex therapy
- C.A.R.E. designed and offered Student Care units which were located in schools. The Student Care units offered:
 - DIRECT SERVICES to children - Located within the school itself as full-time services and were available during school hours. The Student Care Units offered services in:
 - Counselling/Psychotherapy for Children with emotional problems
 - Remedial education for Children with Learning Disability
 - Services for Gifted children
 - INDIRECT Organizational Consultancy (OD efforts) - **Indirect Services** offered Consultancy (OD) or fulfilled the aspirations of school ownership and included:
 - Curricular Re-design to align Teaching methodology with inputs based on developmental learning especially in Primary and Pre-School
 - Correcting deficits across the school in Scholastic Areas such as Math, Language, Sciences etc.
 - Improving teacher motivation and morale
 - C.A.R.E changed organizational beliefs and practices which impacted student performance. Schools included, both Private ICSE & Govt. supported SSC schools in Mumbai.

Work in Healthcare

Helped run the family setup of 2 General, Maternity & Surgical Hospitals and 5 outreach clinics across 3 Suburbs in Mumbai.

Work with Other Voluntary organizations

With the Indian Health Organization over 3 years to design and carry through community mental health programs

Helped start up the first 24 hour telephone Crisis centre for Women and Children in distress in Bombay.

Work with Legislative Ends

Reviewed existing legislation on Mental Health across countries for the Mental Health Bill (now Act) in the late 80s.

Worked with the consultative group to contribute to 'The Domestic Violence Act.

Work with Industry

Worked, as Director-Organisational Development Services, from 1989-92, offering consultancy services as an extension to Industry. Industry segments included Capital Goods manufacturers, NBFCs and large Engineering and Construction companies.

Post 1992, worked as an Independent consultant, with Organisations, providing Organizational Development Consultancy services which continued upto 2000.

In the new millenium

Annexure 1: THE CORE TEAM

CHAIRMAN / CHIEF MENTOR

NEERAJ RASTOGI

He is a Canadian serial entrepreneur having founded, acquired and sold several internet businesses in the early years of the Dot-com boom. He is the younger brother of Dipak Rastogi, who was head of Citibank's Venture Capital arm CVIC for over two decades in London and Singapore.

CHIEF VISIONARY OFFICER / FOUNDER

G VENKATRAMANI (M.Sc Physics, MBA IIM-AHMEDABAD)

VENKAT has completed his Bachelors and Masters degree in Physics from Delhi University and his Masters degree in Business from the prestigious Indian Institute of Management, Ahmedabad (IIMA) batch of 1989, which is widely recognized as one of the most significant batches from IIMA, with billionaire enterprise builders and many other professionally serving CXOs.

He has over thirty years of experience in Production, Marketing and Finance. Prior to his MBA, he worked for 4 years as Managing Partner of a family owned enterprise, an Engineering unit in Coimbatore, which was one of the biggest sub-contractors to one of the world's largest Textile Machinery manufacturer, Lakshmi Machine Works.

After his MBA, he started his career in Advertising. He began as an Account Planner with leading agencies like RK Swamy/BBDO, FCB Ulka, TWA Bates Anthem, where he received through grounding in Market Research - both Quantitative and Qualitative, industry research, competitive analysis and marketing strategy development. With Account Planning being a Lead function in Business Development, making speculative client pitches, he worked across over 40 product categories across industries.

He entered the capital markets in 1994 and has since then, over Twenty-four years of experience, starting as a Research Head and working across various functions including Equity Sales, Operations etc.

Between 2006-7, he had gained experience on the Buy side – Asset/Investment Management in a Hedge Fund and later as a Strategic Advisor to the Board of Directors, while working last as Executive Director of SMC GLOBAL, a leading Indian Financial Intermediary.

He is currently leading the effort in his independent venture, 4S-ADVISORY, which is into advisory services for both Public and Private markets.

He is the Founder and Chief Visionary Officer of TruHealthkare PHS LLP (THK). THK is working for the last 3 years, on a disruptive Technology called CDRS, short for Complete Digital Recording System which is Designed to make seamless flow of Data in Medicare which has wide application in creating a Futuristic Proactive Preventive Medicare system.

Venkat brings to the table, a mature profile and experience in all facets of Management with strong intrapreneurial qualities and excellent connectivity to Corporate India.

CTO/DOMAIN SPECIALIST/CO FOUNDER

Dr PRASHANT AZAD MBBS MD Psychiatry

M.B.B.S. - 1982, from Grant Medical College, Mumbai.

Joined MD in Psychiatry and completed requirements for Bombay University through Grant Medical College and the JJ Group of Hospitals, through 1984-85.

Work in C.A.R.E.

- From end 1984, left Psychiatry, to conceive and found C.A.R.E. (Centre for Applied Research in Epistemology). C.A.R.E. offered a structured training and supervision program in Psychotherapy for

Research in Rural development including working models of water harvesting, soil improvement, & livelihood projects in Rural settings for marginal farmers and submitted an integrated rural development project to NABARD in 2007.

Setting up and running a Senior citizens home at cost. Additional services in Mumbai and Nashik to be set up.

Upgradation of the Quality of Education for the 4 primary and 1 secondary Cantonment Board Schools in Devlali at the request of the CEO, Cantonment Board. The Project delivered the outcomes listed below:-

Increase In the SSC results from 49% to over 89% across 4 years

Reversing attrition of 10% in school enrollment to a increase in enrollment of 10% each year after 1 year of work.

Breakdown of the existing social barriers to richer student teacher interaction

Achieved rapid change in attitudes, curricular redesign, teaching methodology to deliver results

First in the Cantonment schools competition in Music(Vocal and Instrumental), Dance, Speech, Theatre, Art, and second place in Sports.

CHIEF BUSINESS OFFICER/CO FOUNDER

VIVEK NIGAM (PGDISM)

Vivek started his career in the advertising industry and worked on several prestigious brands and companies. Subsequent to that he joined the liquor industry as a Product Manager. After spending a couple of years marketing various brands of alcohol, he moved to the entertainment industry and worked for the video distribution arm of Universal Studios and Paramount Pictures, Hollywood in India. Ensuing that he headed a SONY India joint venture that launched the first legitimate Laser Optical Discs in the country.

His next stint was in the Direct Selling Industry as a Consultant, where he pioneered the direct selling revolution in the country. He went on to create one of the largest networks of direct sellers in the country, with its offshoots also present in other Asian countries. After that he joined a company that had interests in Design and Music and produced the first and the largest festival of original music ever held in India, with more than 60 Indian and international bands performing over a period of three days.

He has also worked with the only individual Olympic Gold Medallist in our country, for the promotion of sports at the grass roots level. After that, he joined a UK based software company as their Head of Operations for India. For the past four years, he has been a full time Management Consultant.

He is passionate about music has played competitive table tennis at the school level. He loves to read and is a fan of the cinema and theatre. He is an intrepid traveller who has travelled around the world acquiring cross-cultural experiences and gaining an insight into how people live and do business across the globe.

Vivek is a performance-driven professional with more than 30 years of continuous advancement and experience in advertising, corporate communications, marketing, sales and project management, including more than a decade as an entrepreneur.

CHIEF PEOPLE & PROCESS OFFICER

ETHEL AZAD B. Com DMM

B.Com - 1981, from Bombay University and DMM (Marketing Management) - 1982, from Bombay University

UNIT TRUST OF INDIA from '81 to 83 in Admin.

MODI XEROX from '83 to '90

- Work Controller in Customer Service, managing, allocating, monitoring and analysing Service Calls of around 50 engineers and interacting telephonically with over a 1000 customers.

- As the first Work Controller in the country, was responsible for training and setting Service standards for subsequent Work Controllers across India.
- Regional Analyst (for Western Region) - To analyse and report on Customer Service i.e. analysis of machines in field, Engineer performance for the entire region and Impact of Service policies on Customer satisfaction.

RICOH INDIA from '93 to '98

- National Analyst 93-94 : Analysed and reviewed Service Policy and its impact on Customer Service Performance, Engineers' performance, machine performance for 17 branches across the country.
- Moved to Head-MIS In 1994
- Reporting to the President, in charge of Budgeting and Forecasting for all functions. Was also incharge of reporting regularly on company performance, to the Board of the Group Company (RPG group).
- Head of HR – 1995 to '98: Created Personnel, HR and Admin Policies and Carried out OD policies and training.

INDUS TELECOM '98 to mid 99

- Head - HR, in a new startup and responsibilities included most initial recruitment, setting up an Induction/Training manual, setting Personal Policy and creating a JD and Personnel/HR manual.

1999 onwards to date

- Joined C.A.R.E. as Director, and worked in the areas of Education, Healthcare, Rural Development, to reform ailing schools, set up a Senior Citizens' Home and to create models for a Pvt. Sector Development project.

Annexure 2: Walker et al

http://www.providersedge.com/chdocs/chr_articles/The_Value_Of_Health_Care_Information_Exchange_And_Interoperability.pdf

Analytic framework: We devised a conceptual framework describing how health care entities share information and created a functional taxonomy reflecting the amount of human involvement required, the sophistication of IT, and the level of standardization. The taxonomy has four levels.

Level 1: Non electronic data—no use of IT to share information (examples: mail, telephone).

Level 2: Machine transportable data—transmission of nonstandardized information via basic IT; information within the document cannot be electronically manipulated (examples: fax or personal computer

[PC] based exchange of scanned documents, pictures, or portable document format [PDF] files).

Level 3: Machine-organizable data—transmission of structured messages containing nonstandardized data; requires interfaces that can translate incoming data from the sending organization's vocabulary to the receiving organization's vocabulary; usually results in imperfect translations because of vocabularies' incompatible levels of detail (examples: e-mail of free text, or PC-based exchange of files in incompatible /proprietary file formats, HL-7 messages).

Level 4: Machine-interpretable data—transmission of structured messages containing standardized and coded data; idealized state in which all systems exchange information using the same formats and vocabularies (examples: automated exchange of coded results from an external lab into a provider's EMR, automated exchange of a patient's "problem list").



Health stack NITI <healthstackniti@gmail.com>

Recommendations on NHS from Prognosys

1 message

Sujit Kaushik <sujit.kn@prognosyshealthcare.com>

Wed, Aug 1, 2018 at 12:14 AM

To: healthstackniti@gmail.com

Cc: Krishna Prasad <krishna.prasad@prognosysmedical.com>, Krishna Prasad Vajapeyam <kp.vajapeyam@gmail.com>, Sunil Monga <linusagnom@gmail.com>, kannanrameshconsults <kr@kannanrameshconsults.com>

Dear Dr. Vinod,

Further to the discussion my colleague and Director, Mr. Sunil Monga had with you and subsequently your invitation to suggest and recommend the operational framework to the National Health Stack, kindly find attached our recommendations, based on our experience of over a decade in Digital Healthcare.

We are glad the way this initiative is being pursued. We are confident, our experience and our existing Digital Healthcare Platform and its framework can be a part of the program, significantly.

We look forward to an early opportunity to meet you.

Best Regards

Sujit Kaushik

COO

Prognosys Healthcare India Pvt. Ltd.#249, 4th Main, Chamarajpet

Bangalore – 560 018

Mob: +91 95388 72561

Other: +91 9845129491

Web: <http://www.prognosyshealthcare.com>

 **PHC - Letter NITI Aayog.pdf**
128K

- Publish and consume Open API's for the care eco system to use and enrich the Health stack.
- Enable bi directional data integration with health initiatives / systems of state governments.
- A Rule based integrated payment gateway which can undertake cashless transfer of money and reimbursements.
- A framework to transform the procurement from a CapEx based system to a more strategic OpEX based procurement, based on usage.
- A platform which conforms and is compliant to the best laid out standards in ICD 10; SNOMED CT, HL 7, HIPAA.
- Specialized web portals and mobile Apps for key stake holders –
 - Patient – The owner of his/her own data and to decide to whom it has to be shared.
 - Provider – Offer Remote consultation and interpretation using mobility
 - Insurance – Offer information about the insights into patient visit, treatment protocol being followed, the approved costing for treatment, available balance and incentivization.
- Share and receive API's to tackle Fraud management during claims.
- A complete Audit check on entries and an audit trail for every record created.

We believe that a system which can include all of these parameters in an open architecture can facilitate a collaborative health system from all eco system partners.

I started Prognosys Medical Systems and Prognosys Healthcare, a decade ago with a vision to build World class Medical equipment in Radiology, and architect **REST APIs based Digital Health Platform**.

From our deep experience of implementing EHR led health registries across the length and breadth of the country, in over 650 locations, we believed in transforming the existing traditional clinic / primary care center to a Digital Healthcare set up using our underlying digital health platform. This transformed clinic can demonstrate the convergence of patient data across the various touch points, allow Tele Health, Tele Radiology and Disease surveillance and help visualize the care continuum, from the patient data.

We are glad to share that all the key constituents of Digital Healthcare Stack espoused in your document and the recommendations we have suggested are **readily available with us** for deployment and use.

Our experience and platform will reduce the time to go live significantly both in transforming the Wellness Clinics into Digital centers and in creation of National Health Stack, is our conviction.

With confidence, we look forward to a meaningful engagement and be a part of the program in a definite way, going further.

We look forward to an opportunity to meet you and further this discussion.

Very Sincerely

V. Krishna Prasad.

V. Krishna Prasad.

President

Prognosys Group

Prognosys Healthcare (India) Pvt. Ltd.

REG. Office: No. 249, 4th Main, Chamarajpet

Bangalore 560018, Karnataka, India

☎ 080 49325700 / 26625765

✉ marketing@prognosyshealthcare.com

🌐 [http:// www.prognosyshealthcare.com](http://www.prognosyshealthcare.com)

PAN No.: AAICP0221D

GSTIN No: 29AAICP0221D1ZU

CIN No: U74900KA2015PTC079050

To,
Dr. Vinod K Paul
Member (Health)
NITI Aayog

Sub: "Creation of Digital Health Eco system - National Health Stack".

Dear Sir,

My heartiest congratulations to the team for envisaging this initiative of creating a centralized health system for all citizens. We are confident from our experience that this initiative will transform healthcare into a more efficient, transparent and economical system.

We wish to share our experiences in operating a Digital Health company since last decade, managing several PHC's through our EMR and Tele Health platform, creating state wide registry of patients accessing the PHC; and architecting a REST API based Digital Healthcare Platform to **Interconnect** various stake holders in the healthcare eco system, allow medical devices to **Intercommunicate** and thereby bring **Intelligence** to the patient data being read by a qualified medical professional.

Based on your invitation to suggest key components to the National Health stack, please find below our recommendations on the architecture:

- A platform based on **REST API** architecture
- A **distributed** architecture for easy interoperability.
- An architecture to support **multi language vernacular** User Interface.
- A **HL 7 compliant Patient Health Record (PHR)** framework which can integrate with existing HMIS system;
- Be able to carry longitudinal patient data across the value chain, from Sub center to District Hospital, public healthcare system to private care systems,
- Carry along the referral, interpretation, prescription and treatment outcomes of every single patient.
- A medical device connectivity framework which integrates
 - Point of Care testing (POCT) equipment
 - Laboratory devices
 - Maternal and Neonatal care equipment
 - Non Communicable Diseases screening and diagnostics equipment
 - Cardiovascular disease, Diabetes, Hypertension, Cancer, Tuberculosis (MTB), Stroke and Seizures;
 - Communicable / Epidemiological diseases Screening and Diagnostics systems.
 - Computer Aided Diagnosis – Artificial Intelligence based system to detect abnormalities in Chest X ray.
- The medical devices should be able to seamlessly transmit data to the Digital Health platform to demonstrate creation of Health registries (against diseases); Health Analytics (Disease prevalence and Incidence)

Prognosys Healthcare (India) Pvt. Ltd.

REG. Office: No. 249, 4th Main, Chamaraajpet
Bangalore 560018, Karnataka, India

☎ 080 49325700 / 26625765

✉ marketing@prognosyshealthcare.com

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PAN No.: AAICP0221D

GSTIN No: 29AAICP0221D1ZU

CIN No: U74900KA2015PTC079050



Health stack NITI <healthstackniti@gmail.com>

National Health Stack - Feedback from Piramal Foundation

1 message

Ramesh Padmanabhan <ramesh.padmanabhan@piramalfoundation.org>Tue, Jul 31, 2018 at
10:49 PM

To: healthstackniti@gmail.com

Cc: Devesh Varma <devesh.varma@piramalswasthya.org>

Dear Sir / Madam

At the outset we would like to commend Niti Aayog for conceptualising the National Health Stack and releasing the consultation paper.

About Us : Piramal Swasthya, an initiative of Piramal Foundation, is a not-for-profit organization working in the primary public health care domain with a focus on Maternal, Child and Adolescent Health, non-communicable diseases (*Diabetes Mellitus, Hypertension, Oral Cancers, Breast Cancers and Cervical Cancers*). From supplementing the existing Healthcare System to advocating changes in it, Piramal Swasthya is pursuing its promise and vision of transforming the health ecosystem through high impact solutions, partnership and thought leadership. Piramal Swasthya endeavours to bridge the last mile gap in primary healthcare service delivery through its innovative solutions. Piramal Swasthya is working with Niti Aayog in 25 aspirational districts to transform healthcare.

We have reviewed the National Health Stack paper and have the following comments

1. **Interoperability** : The interoperability section in the paper covers interoperability between disparate systems through the Open APIs and Standards. To create a longitudinal health record and provide continuum of care it is imperative that the health records are interoperable and can seamlessly move across different health systems. This can be achieved by utilising standards for health records or by having an intelligent aggregator to interpret the variety of health records in the system. Our suggestion is that the paper can have a section which covers the architecture behind creating a single health record per citizen in the stack.
2. **Primary Healthcare Platform (AMRIT)** : Piramal Swasthya is building a healthcare platform for primary healthcare called AMRIT (**A**ccessible **M**edical **R**ecords via **I**ntegrated **T**echnologies), which will create a unified and ubiquitous presence of Health Data of the patients in primary healthcare with unique Beneficiary IDs. AMRIT is built to operate in both offline and online mode and can be used to capture health records from Sub Health Center and upwards to PHC. This will not only enable creating the electronic medical record of the beneficiary right from the first encounter at the village level it will also be sent to the nearest Primary Health Center as referral and also to the Community Health Center. Medical devices connected to AMRIT will capture various health parameters of the beneficiary from Sub Center level and will be able to send the medical record to the Primary Health Center and also Community Health Center. AMRIT has a Decision Support system which provides health professionals assistance with clinical decision-making tasks. This also enables the system to have Evidence Based Decision Making thereby helping health workers in arriving at a better diagnosis. It has a robust data analytics engine built into it. This is based on the data that

gets fed into the system as part of medical records, disease data, lab tests and diagnosis. AMRIT also provides the ability to connect beneficiaries with Specialist and Super Specialist via Tele-Medicine Consultation.

AMRIT is being built as a platform for public good and can be integrated with the National Health Stack to provide a primary healthcare platform for all citizens.

We would like to meet the team working on the National Health Stack and understand the Stack better and exchange ideas so that we build a platform equipped to deliver solutions to the four big challenges of healthcare faced by the people of India— availability, accessibility, affordability and acceptability.

Thanks & Regards

Ramesh Padmanabhan

Chief Technology Officer

M: +91 9820187572

E: ramesh.padmanabhan@piramalfoundation.org





Health stack NITI <healthstackniti@gmail.com>

National Health Stack : Oracle

1 message

Rocky Dhar <rocky.dhar@oracle.com>

Tue, Jul 31, 2018 at 10:08 PM

To: healthstackniti@gmail.com

Greetings!

Oracle unbiasedly values and appreciates the immense efforts and the respective thought processes involved in raising such a widespread vision statement around the healthcare landscape of India.

Oracle is pleased to submit its comments and views on the concept note for the National Health Stack. Oracle has attempted its best to bring out the oracle experience and the associated learnings (attached) in similar large multi-agency public healthcare program implementation across the globe –

- Oracle Health Insurance is a solution that supports public healthcare payers operating in social health insurance systems for example in Latin America (Chile), Middle East (UAE), and Europe

(Netherlands). Oracle Health Insurance also demonstrated its capabilities to support US healthcare payers under Obamacare.

- Oracle Health Insurance enables healthcare payers to contain the claims burden. Oracle has references achieving up to 8% reduction of claims burden by real time checking claims for administrative errors and potential fraud.

- Oracle Health Insurance provides the flexibility to comply with local regulatory requirements. Oracle's rule driven approach enables healthcare payers to quickly implement changed requirements without software coding.

-

- Oracle Health Insurance enables healthcare payers to implement process automation (straight through processing). Oracle references have achieved auto adjudication rates up to 99%. This process automation enables healthcare payers to scale up to very large numbers with limited operating staff.

-

- Oracle Health Insurance provides extensive capabilities for securing protected health information and is HIPAA and GDPR compliant.

-

- Oracle Health Insurance supports the creation and use of standard or proprietary code sets such as code sets for diagnoses (e.g. ICD-10), DRGs, and medical services. Code sets can be added

or adjusted through configuration significantly reducing the effort of implementing new or new versions of code sets.

- Oracle Health Insurance provides capabilities for analyses and reporting that for example can be leveraged to analyze fraud patterns, healthcare provider utilization, healthcare

provider benchmarking, etc.

- Oracle's open and extensible architecture can integrate with any 3rd party technology such as smart cards, enrollment solutions and provider/hospital portals. Furthermore Oracle

Health Insurance provides support for partitioning of data and fine grained security control to allow for access by Insurers or TPAs as required.

We're awaiting an opportunity to connect in-person at the earliest possible.

Regards

Rocky Dhar

Oracle India Private Limited

M: 919871933722

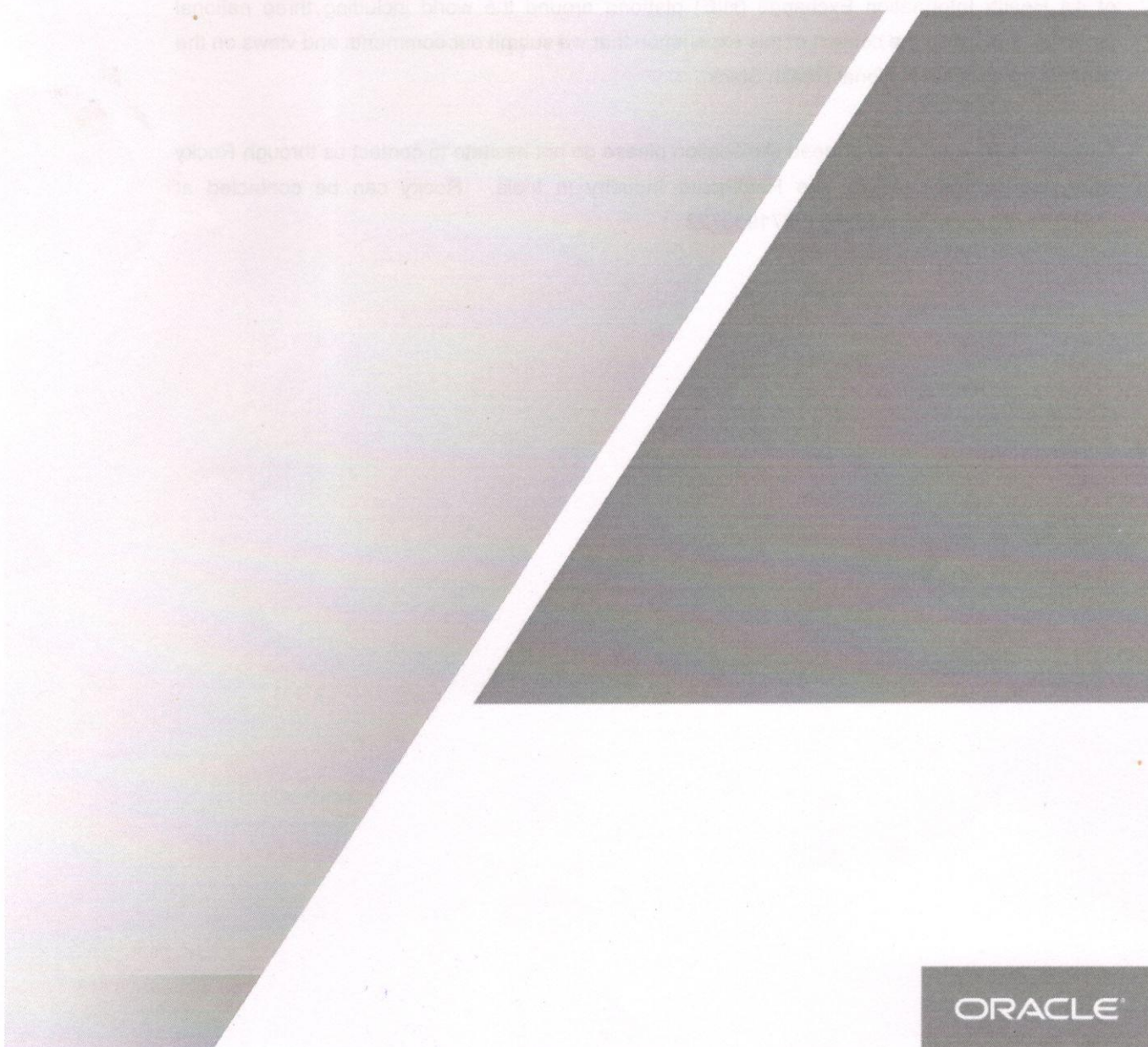


Oracle_National Health Stack.pdf
288K

Oracle comments and views on the National Health Stack – Strategy & Approach Document

Oracle India Private Limited

JULY 2018



Introduction

Oracle is pleased to submit our comments and views on the concept note for the National Health Stack – Strategy and Approach document for consultation.

The Healthcare Industry at home here in India and internationally largely agrees that information technology investments in the area of Integrate Health Information System will result in increases in healthcare efficiency and improvements in patient outcomes. Oracle has amassed much experience in this area as an organization that has been involved in at least 20 implementations of its Health Information Exchange (HIE) platform around the world including three national projects. It is within the context of this experience that we submit our comments and views on the concept note for the National Health Stack.

If you have any questions or need clarification please do not hesitate to contact us through Rocky Dhar, the Oracle Lead for the Healthcare Industry in India. Rocky can be contacted at rocky.dhar@oracle.com. M: +919871933722

Comments and views on the concept note for the National Health Stack

Section Number	Comment
1. Executive Summary & National Health Stack (NHS Overview)	The section offers a brief yet succinct articulation of the goals, current Health IT context and therefore the reason why National Health Stack is required. Well done.
2. Electronic Registries and Approach and Considerations for designing Electronic Registries	<u>National Health Registry</u> National Health Registries are expected to be the single source of truth for master data pertaining to insurance and clinical entities. Subjects of registries will be natural persons, organisations, business entities, and clinical and business data dictionaries, terminologies and code sets. Sources of data for registries will vary depending on the subject. • Person data would be provided by individuals themselves and/or business enterprises, government agencies and other holders of person records. Subjects would be Consumers, Patients, Doctors, Beneficiaries, Family Members, etc. • Organisation data would be provided by organisations, government agencies, professional registration bodies, and others. Subjects would be Providers, Insurance Organisations, etc. • Data Dictionaries, terminologies and code sets would be provided by government agencies, regulatory bodies, industry bodies, standards organisations and similar. Examples would be SNOMED, LOINC, ICD, RxNorm, etc. • Natural persons are typically identified using their demographic information which might include family and given names (which may change over time), gender (which may change over time), date of birth, addresses (which may change over time), and national, state or organisation identifiers of different kinds. • Organisations are typically identified by their names (which may change over time), addresses (which may change over time), registration identifiers and similar. <u>Terminology Normalization</u> • Terminologies and code sets may be standardised by industry bodies or standards organisations, may change over time, may be versioned and perhaps may be cross-mapped to other terminologies where terminology domains overlap to a significant degree, making it possible for user to use one or another terminology for coded data for the same subject entities. • Terms in Terminologies would be identified by their terminology identifier and version, issuing authority, code and description. Terminology cross-maps would define equivalences between code identifiers in mapped terminologies.

- Clinical and Business Data Dictionaries may be standardised by standards bodies, industry bodies, government entities. The structure may vary but is likely to include the code and its definition, perhaps temporal validity and similar system attributes that would aid in search and determination of applicability and validity.
- Platform that would support Person and Organisation registries would be expected to provide a highly-flexible, configurable Data Model so that person attributes can be defined as required by each registry type.
- The platform would provide the means to normalise and standardise attribute values using configurable business rules, alias dictionaries and phonetic algorithms. It would support deterministic matching, probabilistic matching using mature and widely-deployed matching algorithms with error detection and correction capabilities, configurable standards-based comparators, configurable matching thresholds, manual matching and potential duplicate resolution, source record history, etc.
- Registries would be expected to allow entities to be registered, their details to be maintained over time and their data to be located by means of identifier- and non-identifier-based search facilities.
- Registration capability should support both bulk load and transaction processing facilities with standard APIs, and a user interface for manual registration. Registries would be expected at minimum to store basic details that would be used to uniquely identify natural persons or organisations, and identify and resolve potentially duplicate identities. Basic details would be supplemented by other data that might allow a data steward to manually resolve potential duplicates if algorithmic processing does not succeed in automatic identity resolution. The registry platform would create a unique identifier the first time it registers a unique entity, then associate this unique identifier with each record subsequently matched to the original entity record.
- This process would, over time, build and maintain a cross-reference index of all identifiers associated with each entity (e.g. Aadhaar, Jan Dhan, driver's license number, etc.), a history of all source records associated with the unique identifier and a history of all changes to entity master record and its corresponding source records.

Master Person Index

- The ability to automate the process of matching records and maintaining cross-reference index of identifiers for individuals and organisations is seen as a key enabler for efficient and accurate person and organisation registries.
- For a patient or an organisation registry in particular, the ability to support standards-based APIs that allow it to be seamlessly integrated and to support Personal Health Record, is seen as a key enabler of health information exchange. Discussion of the PHR, see below, introduces the IHE-compliant XDS-based

framework, which relies upon accurate identification of subjects of clinical records and care providers. IHE defines Patient Identity Cross Reference (PIX), Patient Demographic Query (PDQ) and Healthcare Provider Directory (HPD) Integration Profiles which support these requirements.

- It is expected that the Patient Registry/Health ID Registry and Provider Registry will support this functionality as well as the functionality discussed in the preceding paragraphs.
- The single Health ID Registry could be considered for maintaining information about Consumers, Patients, Beneficiaries and Family Hierarchies. If required, separate registries, that employ features mentioned above, could be created to reflect specific requirements associated with distinct person types.
- Some of the solution that address the requirements of Patient Registry include additional functionality that enables implicit and explicit creation of Family Taxonomies, Provider Organisation Member/Employee Taxonomies, Care Team taxonomies, etc., as a side effect of registering patients, family members, beneficiaries, doctors, providers, etc.. It is suggested that considering a solution that includes this functionality would be advantageous.
- Terminology normalisation would typically be required when semantic interoperability of clinical information is desired. The Personal Health Record (PHR) would require terminology normalisation if, for example, different laboratories use different medical terminologies to code the same laboratory tests. Terminology normalisation can be externalised as an Enterprise Terminology Service, which would both server as a terminology/code registry for the various standard and local terminologies and as a service that provides transformation between semantically equivalent codes in different terminologies or different versions of the same terminology. It seems advantageous to implement the terminology registry as not just the registry for code lookups but also as a terminology transformation service.
- Solutions selected for Registries, Personal Health Record or Analytics may already include Data Dictionaries that apply to the data models they provide. Ideally, these pre-existing data dictionaries should be surfaced to allow relevant users to understand data models, terms, meanings and properties of data attributes used in the solutions. If desired, these dictionaries could be used as the basis of the National Data Dictionary, consolidated, reconciled and extended as needed.
- IHE standardised APIs are used by patient identity providers and consumers to interact with the document Patient Identity Cross-reference Manager (PIX Manager) and Patient Demographic Query Supplier (PDQ Supplier) in IHE-compliant health information exchanges.
- Typical solutions used for registries may also include proprietary SOAP and REST APIs that expose rich functionality going beyond that provided by the IHE-compliant APIs. These APIs would be registered and managed via centralised API Gateway as they are or can be encapsulated with APIs wrappers which themselves would be registered with and managed via a centralised API Gateway if required. [NHS

Single Central Registry Vs Multiple Registries

- A single central person registry may not be optimal for the population of India. It may be advantageous to consider a 2-/3-level hierarchy of person registries, with central registry consolidating registrations from state-based registries and perhaps these consolidating registrations from smaller administrative divisions or groups of healthcare organisations.
- This model would permit lookup of person details across geographic and administrative boundaries while localising search and improving retrieval efficiency, and distributing maintenance burden amongst operators of registries.
- This is suggested on the basis that most patients will receive services in their local areas and only seek services elsewhere on relatively few occasions. [NHS Framework: Guiding Principle 2][NHS Overall Design: Principle 4][NHS Overall Design: Principle 3]
- Patient/Person/Doctor/Provider Registries are in production use as part of EHRs at national and regional level, and independently in hospital and hospital group contexts in many countries in the world including Australia, United States and elsewhere. Support for standards-compliance, vendor product compliance, availability of practical industry experience and international health systems' experience could be drawn upon for lessons learnt and best practices.

Security, Audit and Consent Management

- Sophisticated solutions typically incorporate appropriate security, audit and consent features. Solutions that provide registry functionality can ingest standards-compliant data objects such as HL7 v2 and HL7 v3 messages, providing the ability to integrate data from legacy systems, and typically offer a rich set of solution-specific APIs that utilise standards-based channel security, and standards-compliant authentication and authorisation mechanism. [NHS Framework: Guiding Principle 4][NHS Overall Design: Principle 4][NHS Overall Design: Principle 10]
- Principle 1 expects that "Patient is the Controller of her data". Australia's national "My Health Record" system was originally named the "Personally Controlled Electronic Health Record" precisely because consent granting and revocation, and personal control over access to the collection of health records or even individual health record was a key underlying principle in the design of the system.
- Provision of this kind of control requires that patient identification (Patient/Consumer/Health ID Registry) and user identity management (Identity Management in traditional authentication and authorisation sense) are combined with provider identification (Doctor Registry, Provider Registry) and entitlements management (appropriately-grained "who is authorised access to what under what conditions" in the access control sense). [NHS Framework: Guiding Principle 1 and 3][NHS Overall Design: Principle 2][NHS Overall Design: Principle 4]

	- Supplemental functionality for securing data at rest and in transit, if not already provided in the selected solutions out-of-the-box, would be provided by data store encryption, message/document encryption and channel encryption to enhance security and integrity of sensitive data. Secure audit trail stores, and security auditing and audit management tools and technologies would provide the means to undertake security-related investigations and other activities aimed at enhancing robustness of security provisions of registries. [NHS Overall Design: Principle 4] - Depending on requirements and feasibility, technologies such as federated or private blockchain could be considered to address nonrepudiation of granting and withdrawal of consent, record creation, modification or access, and other key transactions.[NHS Overall Design: Principle 3][NHS Overall Design: Principle 4][NHS Overall Design: Principle 10] - The registry platform, in particular the patient registry, should be able to support generation of de-identified sensitive data that can then be used for research and other purposes, and the ability to re-identify patients if clinical necessity arises. - The suggested 2-/3-tier person registry model is scalable by design and is expected to be able to scale to support the entire population of India. Technology of the solution should be cloud-ready or available in cloud-at-customer, private cloud, public cloud or both, depending on the sensitivity of data sets and other relevant factors. [NHS Overall Design: Principle 8]
5. Coverage and Claims Platform	An end to end Coverage and Claims platform should include: <u>Component Based Approach and Interoperability</u> It is critical that the platform takes a component based approach to allow for heterogenous environments and interfaces depending on third party requirements such as health insurers or TPAs, medical researchers, auditors, policy makers etc. The interfaces to the components should support open standards such as REST and Web Services (SOAP) for complete interoperability and digitization. A common security model is also critical for these integration points to ensure that any interaction with third parties is properly authorised. <u>Security & Audit Capabilities</u> The coverage and claims platform includes sensitive PHI level information embedded in claims data. It is essential that the platform support best practices such as HIPAA, GDPR or equivalent to ensure that technical controls are adequate. These audit mechanisms need to be applied regardless of interfaces used (user interface or API) and often will also need to include the logging of view operations in addition to data modification. The platform should provide the ability to encrypt data at rest and in transit. The components within the platform should be capable of supporting a common identity provider across both user interface and API access so that security access can be centrally managed.

	<u>Extensibility Model</u> The extensibility model should be based on configuration which can be shared and governed between the policy administration (coverage) capability and claim engine capability. The extensibility approach should provide for flexibility/speed but also provide appropriate governance and controls so that data model changes between environments/instances of the components is controlled. Furthermore changes to the data model should be consistent across user interface and API integration points for maximum benefits. <u>Multi Jurisdiction Support</u> The ability to configure rules and settings by jurisdiction enables localisation of the platform while maintaining the efficiencies of a shared service. Rules should be configurable so that these can be applied holistically and also for a selected jurisdiction or provider network as needed. <u>Technological Innovation</u> Disruptive technologies such as block chain should be explored as a futuristic way of doing health care related transactions, including the ability to setup and recognize smart contracts, and make the claim process frictionless as possible. A proof of concept would be the best way forward in this direction to assess solution fitment before adoption.
6. Claims Engine	A modern high-performance claims engine has several required characteristics which all combined can deliver excellence in claims processing. These include: <u>Rules Based Approach</u> Claims pricing and adjudication requires the application of complex rules to correctly process a claim. These rule types can include provider network rules including agreed provider fee schedules, claim line pricing rules including consideration of episode or case level considerations, support for various claim line coding schemes such as DRG or ICD and benefit calculation including consideration of limits. These rules are in addition to fraud detection rules such as medical necessity or anomalies in claim patterns. Having a rule based core to the claims engine provides significant flexibility to address health payer challenges. These include: • The ability to change at speed. We have seen globally that health care and health payer reform places increasing demands on claim engines to adopt new rules and requirements. It is essential that the business' rules can be abstracted from the underlying engine so that these can be tested, modelled and deployed as required. The solution should have a configuration over customisation principle so that changes can be made without modification to the core system. • Date driven rules. Policy and claim processing rules change over time and the ability to enable and retire rules over time is key. These rules however need to be retained for historical processing such as claim reprocessing. • Enabling digital engagement through the application of rules to various citizen and provider facing services. These rules should be exposed via a comprehensive API layer so that engagement platforms can adapt as needed to suit consumer

demands. Examples of engagement platforms that can consume these rules include portals, sales and service platforms and chatbots on all device types.

- Robust rule configuration management tooling. Authorised users should be empowered to configure and deploy rules for testing within development environments. Similarly role based access controls should ensure that there is sufficient governance and separation of duties to develop, test and deploy rules to production.
- The ability to reprocess claims and model the impact of rule changes. The interaction of rules can make modelling outcomes difficult so the ability for a system to test the impact of rule changes is essential.
- Providing traceability of rules to support testing and audit/QA processes. It should be possible to inspect the rules that have been applied to price and adjudication claim lines including call outs made to other systems such as claims integrity engines.

Alternate Reimbursement Models

As public and private health payers alike seek to control claims costs support for various reimbursement models is essential. Traditional fee for services models are now combined with alternate models such as capitation, bundled payments and shared savings. It is fundamental that the claims engine is aware of these different reimbursement models to provide long term flexibility but also reduce administrative and payment errors due to inconsistencies in claiming across the various models.

Straight Through Processing/EDI

It is critical that a claim engine can support various EDI formats including coding schemes that may be adopted over time. These coding schemes such as DRG, ICD and others often differ by claim type/modality and the system should have the flexibility to validate and process these as required.

Straight through processing of claim line information is critical to ensure the necessary cost savings and efficiency with some health payers achieving 99% plus. The ability to support the rules required to support end to end claim processing is key along with flexibility in pend rules.

Scalability

Medical claims processing can be complex and requires the application of multiple groups of rules to validate claim information, run claim line pricing calculation, apply fraud detection and adjudicate the claim to determine benefits payable. It is critical that the claim engine is designed from the ground up for scalability including the use "in memory" approaches where possible. Claim processing across claim lines can include very large volumes of work and it is critical that these can be processed at speed.

Call outs

The National Health Stack identifies the need for the Claims Engine to call out to the Fraud Management Service to apply the necessary rules. To enable long term flexibility the Claims

	Engine should be configurable to call out to third party services as needed at various points within the claim workflow including pre-processing checks, groupers, pricing engines and adjudication engines such as the Fraud Management Service. This call out approach should be configurable based on the claim type(s) and procedure group(s) involved. As an example the claim engine could make use of various medical necessity libraries to determine claim outcomes and these can differ based on procedure groups along with other attributes of the claim as required. <u>Cloud would make adoption easy</u> Consuming any solution as Software as a Service (SaaS) on cloud will be key to the success of Pradhan Mantri Rashtriya Swasthya Suraksha Mission (PMrSS). This consumption model will help in easy adoption of the solution by central and state governments, private and public players engaged in delivering the health care services in the country. Several cloud based deployment models exist in the market such as Private, Public or hybrid cloud and an option analysis would be the best way forward to find a solution 'fit-for-purpose'. Cloud solutions have proven worldwide to provide high degree of scalability, reliability and availability even in strictly regulated markets. Furthermore, options like an active-active disaster recovery site can make the National health stack highly available, should a failover have to happen.
7. Fraud Management Service	Fraud Management is fundamental to driving cost savings and the ability to configure the claims engine to conduct fraud checks "in process" and pre-payment is key. Fraud Management needs to include various types of real time checks including: • Plausibility – Is the claim/provider combination reasonable in the context of other claims made with the same time period (regardless of patient). These checks often identify service volumes and service codes for a provider which seem unreasonable. Example: A physiotherapist claiming more than 32 physiotherapy sessions per day • Medical Necessity – are the claims lines reasonable and necessary given the diagnosis/presenting illness. This class of checks can identify situations such as where prescribed drugs are not aligned to the condition or where the combination of medical procedures are not appropriate to the diagnosis. • Combination Claim Checks – checking for claims where the combination of claims is not valid. Examples could include fillings for patients that have previously claimed for dentures or claims for items which should have been included in a bundled package. • Patient Appropriateness – Is the claimed procedure appropriate for the patient age, gender or similar. • Provider rendering service for which he is not authorized • Claims not matching pre authorized limits It is important to note that many of the above fraud checks include the need to validate claims within the context of other claims made (either for the same patient or across patients).

	Leveraging smart analysis and reporting capabilities to analyze fraud patterns, healthcare provider utilization, healthcare provider benchmarking is key for sustainability of any health care system in the world. It is also key to stand up multiple lines of defence against fraudulent practices prevalent in the health care system. 1st line of defence should be built at the registry layer and the 2nd line of defence in the claims engine. This 2 tier approach will help minimize claims rejection rate and back and forth conversations leading to direct cost savings and productivity for the health payer.
8. Federated Personal Health Records Framework (PHR)	<u>IHE- Global standard for Health Information Exchange</u> • In an ongoing effort to address IT interoperability challenges present in healthcare, various standards and industry bodies engaged in efforts to develop international standards and industry best practices. • The "Integrating the Healthcare Enterprise" (IHE) is an industry body which continually reviews health system requirements, international and industry standards, and vendor implementations. • IHE develops "interoperability profiles" which guide vendors in building interoperability into their products to minimise challenges faced by the need to integrate multiple healthcare applications. • IHE conducts "Connectathons" which enable application integration to be formally and independently tested, giving customers the assurance that an application being "IHE-compliant" means that it will interoperate by configuration with other applications which are IHE-compliant with the same IHE Integration Profiles. [NHS Overall Design: Principle 3] <u>Interoperability</u> • One of the major IHE interoperability areas is the Cross-enterprise Document Sharing (XDS). IHE XDS addresses the requirements of federating clinical document repositories for the purpose of providing secure, standards-compliant access to clinical documents that supports repository models ranging from centralised to massively distributed. [NHS Framework: Guiding Principle 2][NHS Overall Design: Principle 4][NHS Overall Design: Principle 3] • Electronic Health Records Systems that use IHE XDS-compliant Registries and Repositories are in production use in a number of EHRs at national and regional level in many countries in the world including Australia, United States and elsewhere. <u>Federated Health Data Repository</u> • It is suggested that IHE XDS approach to federating health record repositories and standardising submission and retrieval of health records will provide immediate advantages for the Federated Personal Health Records Framework in terms of support for standards-compliance, vendor product compliance, availability of industry and international health systems' experience that could be drawn upon for

lessons learnt and best practices.

Open API

- IHE XDS standardised APIs would be used by clinical document providers and consumers to interact with the document Registries and Repositories. These APIs would be registered and managed via centralised API Gateway as they are or can be encapsulated with APIs wrappers which themselves would be registered with and managed via a centralised API Gateway if required. [NHS Framework: Guiding Principle 6][NHS Overall Design: Principle 2]

Security and Consent Management

- IHE XDS incorporates security features, audit features and consent features. IHE XDS can ingest structured objects (CDA, CCD) and unstructured objects (PDF, image, text, etc.), providing the ability to integrate clinical data from legacy systems as well as from modern systems which support CDA Level 2 and CCD documents. [NHS Framework: Guiding Principle 4][NHS Overall Design: Principle 4][NHS Overall Design: Principle 10]
- It is recognised that IHE XDS alone does not address all requirements. For example, the ability to parse CDA Level 2 documents and store atomic data in addition to whole documents is not addressed by XDS.
- Normalisation of healthcare terminologies is another area that XDS does not address but which is critical to the ability, for example, to compare laboratory results from laboratories that use different terminologies for the same tests (e.g. SNOMED, LOINC) or to plot results for tests coded with different terminologies for readily-discernible trends and longitudinal studies. Those, and other functionality areas required by real world implementations are provided by sophisticated product offerings that supplement XDS-mandated features.
- Some of the offerings in the marketplace support both XDS and the emerging FHIR standard. The full impact of FHIR is yet to be felt in health systems so caution should be exercised when considering its use in large-scale national federated health record systems.
- While IHE XDS and products that provide additional features to extend XDS would address the federation of clinical repositories, atomic data persistence, and terminology management, additional functionality is needed to address other requirements articulated in the guiding principles.

Patient controlled Electronic Health Record

- Principle 1 expects that "Patient is the Controller of her data". Australia's national "My Health Record" system was originally named the "Personally Controlled Electronic Health Record" precisely because consent granting and revocation, and personal control over access to the collection of health records or even individual health record was a key underlying principle in the design of the system.

	• Provision of this kind of control requires that patient identification (Patient/Consumer/Health ID Registry) and user identity management (Identity Management in traditional authentication and authorisation sense) are combined with provider identification (Doctor Registry, Provider Registry) and entitlements management (appropriately-grained "who is authorised access to what under what conditions" in the access control sense). [NHS Framework: Guiding Principle 1 and 3][NHS Overall Design: Principle 2][NHS Overall Design: Principle 4] • Supplemental functionality for securing data at rest and in transit, if not already provided in the selected platforms out-of-the-box, would be provided by data store encryption, message/document encryption and channel encryption to enhance security and integrity of sensitive data. • Secure audit trail stores, and security auditing and audit management tools and technologies would provide the means to undertake security-related investigations and other activities aimed at enhancing robustness of security provisions on the PHR. [NHS Overall Design: Principle 4] • Depending on requirements and feasibility, technologies such as federated or private blockchain could be considered to address nonrepudiation of granting and withdrawal of consent, record creation, modification or access, and other key transactions.[NHS Overall Design: Principle 3][NHS Overall Design: Principle 4][NHS Overall Design: Principle 10] • The IHE XDS-based PHR, and all of the supplementary functionality XDS are scalable by design and are expected to be able to scale to support the entire population of India. • PHR should be cloud-ready or available in cloud-at-customer, private cloud, public cloud or both, depending on the sensitivity of data sets and other relevant factors. [NHS Overall Design: Principle 8]
9. National Health Analytics Platform	The National Health Analytics Platform is expected to over time incorporate new and emerging technologies and solutions that will include the BigData and related analytical tooling and methodologies. The National Health Analytics platform should have following key capabilities: • Stream Analytics for real-time event processing both for fraud detection and for health status monitoring, anomaly detection and alerting, epidemiology, and real-time health enterprise and national health status review. • It is expected that availability of large bodies of data collected throughout the country and deposited in traditional relational and BigData stores will facilitate development and training of machine learning models, their refinement and deployment for automation and reduction of human errors, as well as trend and causation discovery, predictive analysis and enterprise-grade reporting and visualisations. • The business intelligence components of the platform will support both reporting and analytic output formats for traditional monitors as well as mobile device form

factors, with attractive and easy to use interfaces.

- The inspirational goals of big data analytics, unstructured and semi-structured data mining and data scientist-driven discoveries are admirable and will very likely bring significant value.
- It must be noted that at only structured, normalised, standardised, validated, comparable and versioned longitudinal data will provide trusted and repeatable basis for enterprise-grade analytics. Only such trusted data will enable both the reflection on what was, the prediction of what should be, the monitoring of change outcomes and consideration of alternative courses of action for improvement of healthcare delivery, patient outcomes and resource utilisation.
- The structured data processing component of the national analytics platform should be based on a defined, and extensible data model, supported by validation, normalisation and terminology management framework. It should be supported by the provider, fully documented and continuously enhanced as dictated by the user requirements and industry developments.
- It should provide a data dictionary, glossary of terms and other artefacts and processes that aid in deploying sound governance structures, mechanisms and processes. The platform should support configurable data validation and exception handling framework as well as terminology management and in-line translation of source terms into standard national terms for concepts and entities used in the health system. It should provide supported extensibility mechanisms that preserve local extensions across product upgrades, mechanism for integration of patient registries and de-identification of sensitive data. It should provide pre-defined, extensible data marts and the mechanisms for rapid integration with business intelligence tooling.
- The analytic platform should support ingestion of clinical, administrative, financial, operational, and, inspirationally, genomic data. The former will support the defined use cases pertaining to claims, billing, epidemiology, disease prevalence, procedures and treatments, and many others. The latter, when combined with corresponding clinical data, will provide the basis for precision medicine and translational research that are bound to become much more prevalent in the years to come.
- Depending on the requirement and the detail of data to be analysed it may be necessary to provide sensitive person data in identifiable or in de-identified form, and perhaps to provide secure means of re-identifying specific patients if data analysis suggest that clinical intervention is required. The Patient/Consumer/Health ID Registry can provide this capability and work in conjunction with the analytics platform as the source of de-identified patient data.
- The platform should support both identifiable and de-identified data. The architecture of the platform may encompass a data store which includes both types of data as well as separate data stores for identifiable and de-identified data. In the former case, access restrictions will be enforced at the extraction time, depending

on entitlements. In the latter case anonymised data store may be surfaced as Open Data while data store with identifiable data would remain protected.

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- Provision of this kind of control requires that patient identification (Patient/Consumer/Health ID Registry) and user identity management (Identity Management in traditional authentication and authorisation sense) are combined with provider identification (Doctor Registry, Provider Registry) and entitlements management (appropriately-grained "who is authorised access to what under what conditions" in the access control sense). [NHS Framework: Guiding Principle 1 and 3][NHS Overall Design: Principle 2][NHS Overall Design: Principle 4]
- Supplemental functionality for securing data at rest and in transit, if not already provided in the selected platforms out-of-the-box, would be provided by data store encryption, message/document encryption and channel encryption to enhance security and integrity of sensitive data. Secure audit trail stores, and security auditing and audit management tools and technologies would provide the means to undertake security-related investigations and other activities aimed at enhancing robustness of security provisions on the PHR. [NHS Overall Design: Principle 4]
- Depending on requirements and feasibility, technologies such as federated or private blockchain could be considered to address nonrepudiation of granting and withdrawal of consent, record creation, modification or access, and other key transactions.[NHS Overall Design: Principle 3][NHS Overall Design: Principle 4][NHS Overall Design: Principle 10]
- The technology underpinning the data store should enable federation, whether by partitioning of data sets or by other means, both to optimise access to local data and to enable effective access to national data.[NHS Framework: Guiding Principle 2]
- The data store and related technologies would be scalable by design and would be expected to be able to scale to support the entire population of India. The NHAP should be cloud-ready or available in cloud-at-customer, private cloud, public cloud or both, depending on the sensitivity of data sets and other relevant factors. [NHS Overall Design: Principle 8]



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500 Oracle Parkway
Redwood Shores, CA 94065, USA

New Delhi Office Inquiries
Phone: +91.11.47469000
Fax: +91.11.40574722

Hardware and Software, Engineered to Work Together

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Health stack NITI <healthstackniti@gmail.com>

Comment - Addition of Health GIS Component

5 messages

mathew j valamparampil <mathewjvalamparampil@gmail.com>

Sat, Jul 7, 2018 at 11:18 PM

To: healthstackniti@gmail.com

Respected Sir/Madam,

Along with the usually envisaged digital improvisations like Big Data, our country should try to incorporate the components required for analysis of 'Geographic Information System (GIS)' components which are very important for tackling the challenges related to Vector Borne Diseases, Communicable diseases and Non-Communicable diseases. Such systems are already in place and widely used in High income countries.

Minor applications of the same have been applied in various parts of India too. (Ref -

<https://www.ncbi.nlm.nih.gov/pubmed/29649883>) Kindly consider this humble suggestion.

Thanking you

--

Dr. Mathew J Valamparampil**Senior Resident****Department of Community Medicine****Govt. Medical College, Thiruvananthapuram****Kerala, India****Health stack NITI** <healthstackniti@gmail.com>

Sat, Jul 28, 2018 at 10:45 AM

To: nita@ispirit.in

[Quoted text hidden]

Mail Delivery Subsystem <mailer-daemon@googlemail.com>

Sun, Jul 29, 2018 at 12:13 PM

To: healthstackniti@gmail.com

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Final-Recipient: rfc822; nita@ispirit.in

Action: delayed

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Last-Attempt-Date: Sat, 28 Jul 2018 23:43:52 -0700 (PDT)

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From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:45:41 +0530

Subject: Fwd: Comment - Addition of Health GIS Component

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From: **mathew j valamparampil** <mathewjvalamparampil@gmail.com>

Date: Sat, Jul 7, 2018 at 11:18 PM

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Dr. Mathew J Valamparampil

Senior Resident

Department of Community Medicine

Govt. Medical College, Thiruvananthapuram

Kerala, India

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Mon, Jul 30, 2018 at 12:22 PM

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To: nita@ispirit.in

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Subject: Fwd: Comment - Addition of Health GIS Component

----- Forwarded message -----

From: **mathew j valamparampil** <mathewjvalamparampil@gmail.com>

Date: Sat, Jul 7, 2018 at 11:18 PM

Subject: Comment - Addition of Health GIS Component

To: healthstackniti@gmail.com

Respected Sir/Madam,

Along with the usually envisaged digital improvisations like Big Data, our country should try to incorporate the components required for analysis of 'Geographic Information System (GIS)' components which are very important for tackling the challenges related to Vector Borne Diseases, Communicable diseases and Non-Communicable diseases. Such systems are already in place and widely used in High income countries.

Minor applications of the same have been applied in various parts of India too. (Ref - <https://www.ncbi.nlm.nih.gov/pubmed/29649883>) Kindly consider this humble suggestion.

Thanking you

--
Dr. Mathew J Valamparampil

Senior Resident

Department of Community Medicine

Govt. Medical College, Thiruvananthapuram

Kerala, India

Mail Delivery Subsystem <mailer-daemon@googlemail.com>

To: healthstackniti@gmail.com

Tue, Jul 31, 2018 at 3:46 PM



Final-Recipient: rfc822; nita@ispirit.in

Action: failed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at

<https://support.google.com/mail/answer/7720>

[https://support.google.com/mail/answer/7720 [ispirit.in 50.63.202.63: timed out]]

Last-Attempt-Date: Tue, 31 Jul 2018 03:16:39 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:45:41 +0530

Subject: Fwd: Comment - Addition of Health GIS Component

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From: **mathew j valamparampil** <mathewjvalamparampil@gmail.com>

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Senior Resident

Department of Community Medicine

Govt. Medical College, Thiruvananthapuram

Kerala, India



Health stack NITI <healthstackniti@gmail.com>

Suggestions related to proposed National Health Stack

5 messages

kalyani mangale <kalyani.united.fcb@gmail.com>
To: healthstackniti@gmail.com

Mon, Jul 23, 2018 at 6:02 PM

Dear Sir/ Madame

The proposed National Health Stack is a good idea on paper but I have some serious questions about it and also some suggestions

1. How this data will be collected?
2. What about the data security of such huge and highly sensitive data?
3. Who will collect this data and will private parties will be part of data collection?

Suggestions:

1. Instead of doing this on national level directly it can be started at the PHC level and then gradually expanded in the country.
2. Though this will help as a public good, concerns of People's right to privacy should be addressed.

Health stack NITI <healthstackniti@gmail.com>
To: nita@ispirit.in

Sat, Jul 28, 2018 at 10:44 AM

[Quoted text hidden]

Mail Delivery Subsystem <mailer-daemon@googlemail.com>
To: healthstackniti@gmail.com

Sun, Jul 29, 2018 at 11:51 AM

**Delivery incomplete**

There was a temporary problem delivering your message to **nita@ispirit.in**. Gmail will retry for 46 more hours. You'll be notified if the delivery fails permanently.

[LEARN MORE](#)

The response was:

The recipient server did not accept our requests to connect. Learn more at

<https://support.google.com/mail/answer/7720> [ispirit.in 184.168.221.49: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: delayed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at

<https://support.google.com/mail/answer/7720>

[ispirit.in 184.168.221.49: timed out]

Last-Attempt-Date: Sat, 28 Jul 2018 23:21:55 -0700 (PDT)

Will-Retry-Until: Mon, 30 Jul 2018 22:14:41 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:44:40 +0530

Subject: Fwd: Suggestions related to proposed National Health Stack

----- Forwarded message -----

From: **kalyani mangale** <kalyani.united.fcb@gmail.com>

Date: Mon, Jul 23, 2018 at 6:02 PM

Subject: Suggestions related to proposed National Health Stack

To: healthstackniti@gmail.com

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Mail Delivery Subsystem <mailer-daemon@googlemail.com>

To: healthstackniti@gmail.com

Mon, Jul 30, 2018 at 12:58 PM



Final-Recipient: rfc822; nita@ispirit.in

Action: delayed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at

<https://support.google.com/mail/answer/7720> [ispirit.in 184.168.221.35: timed out]

Last-Attempt-Date: Mon, 30 Jul 2018 00:28:20 -0700 (PDT)

Will-Retry-Until: Mon, 30 Jul 2018 22:14:41 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:44:40 +0530

Subject: Fwd: Suggestions related to proposed National Health Stack

----- Forwarded message -----

From: **kalyani mangale** <kalyani.united.fcb@gmail.com>

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To: healthstackniti@gmail.com



Message not delivered

There was a problem delivering your message to **nita@ispirit.in**. See the technical details below.

[LEARN MORE](#)

The response was:

The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720> [ispirit.in 50.63.202.63: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: failed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at

<https://support.google.com/mail/answer/7720>

[ispirit.in 50.63.202.63: timed out]

Last-Attempt-Date: Tue, 31 Jul 2018 03:07:59 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:44:40 +0530

Subject: Fwd: Suggestions related to proposed National Health Stack

----- Forwarded message -----

From: **kalyani mangale** <kalyani.united.fcb@gmail.com>

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Subject: Suggestions related to proposed National Health Stack

To: healthstackniti@gmail.com

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Health stack NITI <healthstackniti@gmail.com>

responses on Health Stack Concept Note

4 messages

Health stack NITI <healthstackniti@gmail.com>

Sat, Jul 28, 2018 at 10:39 AM

To: nita@ispirit.in

Dear Madam,

Please find the responses , attached.

Akshat Mandloi
YP (Health)
NITI

**summry response on NHS Concept note.pdf**

92K

Mail Delivery Subsystem <mailer-daemon@googlemail.com>

Sun, Jul 29, 2018 at 11:32 AM

To: healthstackniti@gmail.com

**Delivery incomplete**

There was a temporary problem delivering your message to **nita@ispirit.in**. Gmail will retry for 47 more hours. You'll be notified if the delivery fails permanently.

LEARN MORE

The response was:

The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720> [ispirit.in 184.168.221.49: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: delayed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at

<https://support.google.com/mail/answer/7720>

[ispirit.in 184.168.221.49: timed out]

Last-Attempt-Date: Sat, 28 Jul 2018 23:02:46 -0700 (PDT)

Will-Retry-Until: Mon, 30 Jul 2018 22:09:45 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:39:44 +0530

Subject: responses on Health Stack Concept Note

Dear Madam,

Please find the responses , attached.

Akshat Mandloi

YP (Health)

NITI

----- Message truncated -----

Mail Delivery Subsystem <mailer-daemon@googlemail.com>

To: healthstackniti@gmail.com

Mon, Jul 30, 2018 at 11:46 AM



Delivery incomplete

There was a temporary problem delivering your message to **nita@ispirit.in**. Gmail will retry for 22 more hours. You'll be notified if the delivery fails permanently.

LEARN MORE

The response was:

The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720> [ispirit.in 184.168.221.49: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: delayed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720>

[ispirit.in 184.168.221.49: timed out]

Last-Attempt-Date: Sun, 29 Jul 2018 23:16:52 -0700 (PDT)

Will-Retry-Until: Mon, 30 Jul 2018 22:09:45 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:39:44 +0530

Subject: responses on Health Stack Concept Note

Dear Madam,

Please find the responses , attached.

Akshat Mandloi
YP (Health)
NITI

----- Message truncated -----

Mail Delivery Subsystem <mailer-daemon@googlemail.com>

Tue, Jul 31, 2018 at 2:26 PM

To: healthstackniti@gmail.com



Message not delivered

There was a problem delivering your message to **nita@ispirit.in**. See the technical details below.

LEARN MORE

The response was:

The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720> [ispirit.in 184.168.221.49: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: failed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at

<https://support.google.com/mail/answer/7720>

[ispirit.in 184.168.221.49: timed out]

Last-Attempt-Date: Tue, 31 Jul 2018 01:56:59 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:39:44 +0530

Subject: responses on Health Stack Concept Note

Dear Madam,

Please find the responses , attached.

Akshat Mandloi

YP (Health)

NITI

----- Message truncated -----



Health stack NITI <healthstackniti@gmail.com>

Microsave: Creation of National Health Stack1 message

Venkat Goli <venkat.goli@microsave.net>

Tue, Jul 31, 2018 at 2:16 PM

To: healthstackniti@gmail.com

Cc: alokkumar.up@nic.in, ruha.shadab@nic.in

Dear NITI Health Stack Team,

Greetings from Microsave ! We are an international financial inclusion consulting firm that works to strengthen the capacity of institutions to deliver market-led. We are already working with NITI on the Spirational Districts Programme and on DBT in Fertilizers Assessment.

We are in receipt of the Consultation paper on the National Health Stack and are working towards providing our comments. As we would like to perform a comprehensive review and augment it with our own research we request if you could further extend the last date of submission to 10th of August.

Warm Rgds

Venkat Goli

+91 9873 148 289



Health stack NITI <healthstackniti@gmail.com>

Comments in the National Health Stack paper- open for consultation

5 messages

Suchitra Mankar <suchitramankar@gmail.com>

Thu, Jul 26, 2018 at 10:48 PM

To: healthstackniti@gmail.com

Dear Sir,

I am an entrepreneur, started telemedicine services after 30

Years in the armed forces as a

Doctor.

My queries:-

1. How would the current softwares used as HMIS, in hospitals, or pharmacy softwares or telemedicine platforms integrate with the national health stack? If this can be openly discussed it would allay a lot of misgivings and apprehensions.

2. What is the time frame that one is looking at for this health stack to be operational?

3. While it is a great idea to integrate all levels of health on a platform, would

Primary, secondary and tertiary care also get tracked parallelly? Meaning, since I may like to

Provide telemedicine at a primary level, could I have community of primary care providers on the platform?

4. Lastly, would e-learning for first aid be enabled in the NHS?

I would love to be part of this exciting new venture. Good luck.

I look forward to a reply.

Dr (Gp Capt) Suchitra Mankar Founder Director

Doorstep Health Services Pvt Ltd

www.doorstephealth.in

Mobile 8888833800

Sent from my iPhone

Health stack NITI <healthstackniti@gmail.com>

Sat, Jul 28, 2018 at 10:44 AM

To: nita@ispirit.in

[Quoted text hidden]

Mail Delivery Subsystem <mailer-daemon@googlemail.com>

Sun, Jul 29, 2018 at 12:30 PM

To: healthstackniti@gmail.com

**Delivery incomplete**

There was a temporary problem delivering your message to **nita@ispirit.in**. Gmail will retry for 46 more hours. You'll be notified if the delivery fails permanently.

LEARN MORE

The response was:

The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720> [ispirit.in 50.63.202.63: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: delayed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at

<https://support.google.com/mail/answer/7720>

[ispirit.in 50.63.202.63: timed out]

Last-Attempt-Date: Sun, 29 Jul 2018 00:00:55 -0700 (PDT)

Will-Retry-Until: Mon, 30 Jul 2018 22:14:23 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:44:22 +0530

Subject: Fwd: Comments in the National Health Stack paper- open for consultation

----- Forwarded message -----

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Doorstep Health Services Pvt Ltd
www.doorstephealth.in
Mobile 8888833800

Sent from my iPhone

Mail Delivery Subsystem <mailer-daemon@googlemail.com>
To: healthstackniti@gmail.com

Mon, Jul 30, 2018 at 2:01 PM



Delivery incomplete

There was a temporary problem delivering your message to **nita@ispirit.in**. Gmail will retry for 20 more hours. You'll be notified if the delivery fails permanently.

LEARN MORE

The response was:

The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720> [ispirit.in 50.63.202.46: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: delayed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720>

[ispirit.in 50.63.202.46: timed out]

Last-Attempt-Date: Mon, 30 Jul 2018 01:31:41 -0700 (PDT)

Will-Retry-Until: Mon, 30 Jul 2018 22:14:23 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

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Dr (Gp Capt) Suchitra Mankar Founder Director
Doorstep Health Services Pvt Ltd
www.doorstephealth.in
Mobile 8888833800

Sent from my iPhone

Mail Delivery Subsystem <mailer-daemon@googlemail.com>
To: healthstackniti@gmail.com

Tue, Jul 31, 2018 at 1:24 PM



Message not delivered

There was a problem delivering your message to
nita@ispirit.in. See the technical details below.

[LEARN MORE](#)

The response was:

The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720> [ispirit.in 184.168.221.49: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: failed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at

<https://support.google.com/mail/answer/7720>

[ispirit.in 184.168.221.49: timed out]

Last-Attempt-Date: Tue, 31 Jul 2018 00:54:03 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:44:22 +0530

Subject: Fwd: Comments in the National Health Stack paper- open for consultation

----- Forwarded message -----

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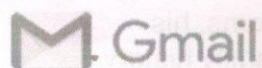
Dr (Gp Capt) Suchitra Mankar Founder Director

Doorstep Health Services Pvt Ltd

www.doorstephealth.in

Mobile 8888833800

Sent from my iPhone



Health stack NITI <healthstackniti@gmail.com>

My submission for success of NHS,

5 messages

Dr Sachin Kuchya <sachinkuchya@yahoo.com>

Fri, Jul 13, 2018 at 12:22 PM

Reply-To: Dr Sachin Kuchya <sachinkuchya@yahoo.com>

To: "healthstackniti@gmail.com" <healthstackniti@gmail.com>

Cc: sachin kuchya <sachinkuchya@yahoo.com>

Dear NITI Aayog,

Kindly accept season's greetings,

Thanks for formulating the policy document with an aim to deliver the same by 2022, and also seeking our opinion.

This initiative has two aspects, one is scientific / medical & the other is model for governance & implementation.

Both are described but the medical aspects needs to defined and planned well enough. Why so? I have certain facts and observations,

1. Most of us have learnt that in US a doctor sees 8-10 patients per day. Why is it so? Because once he has seen his patient, he needs to update the same in electronic medical records (EMR), submit the same – without any error then only he gets his payment from the Insurance company (for the same reason he cannot assign a data operator for the same). Sharing below the link, to the scientific study detailing the same (published in Sept 2016)

<http://annals.org/aim/article-abstract/2546704/allocation-physician-time-ambulatory-practice-time-motion-study-4-specialties>

2. Currently EMR's are built day in & day out in most of the corporate hospitals & a good number of clinics too. But they are designed to support their specific fields of interest and are not shared too. They too have data loggers who do a door to door survey, but that to support their business.

3. Third, most of the data is captured by receptionists or health care personnel, who is ill paid, doesn't have scientific background (so cannot appreciate the need for authenticity and value of the data he/she is capturing).

4. The data captured is for the diseased subject only, no healthy person will just visit a OPD or Hospital to get his EMR built upon.

5. Almost of this data lies with the private sector, government doesn't have access to the same.

6. Most of these EMR's do not answer scientific / public health questions – what's the Incidence, prevalence, reasons behind and current approach (being practiced) for their control, cure and eradication.

So my submission is,

1. To have a e-health screening platform, the beneficiary shall login with his Aadhar

Number. And answer some basic questions with respect to any of his symptoms, his medical history, current level of fitness or effort tolerance, his life style and family history.

2. Based upon this set of information, a provisional health score or a list of diseases he is suffering from or at risk of, can be generated. And the subject can be requested to book an appointment at the nearby secondary or tertiary health care facility.

3. At the facility, he undergoes a vital examination (BP, HR, Blood sugar level, Weight, Height) and this data will be updated to his profile.

4. Then, the physician can reconcile the information / data submitted by the subject - along with his Vitals; may seek more relevant information and validate / modify the provisional list of diseases, he is suffering from or at risk of.

5. He is then counselled & or sent for necessary workup and consultations, if needed.

5. At the end of this exercise, the subject has his EMR which is fully updated and useful for further use, may be months or years later. The Wellness will be promoted like never before.

I am practicing the same, working on it continuously for 4-5 years. I have designed one for adults 18-65 years of age & it can be designed for others, too. I am hereby sharing one of the google form, demonstrating the idea behind.

<https://docs.google.com/forms/d/e/1FAIpQLScPG845hk4etuLWf-c7EeeM5wyhg-WGHs0ISw7pZRCgGEUX1A/viewform>

I am also sharing the pdf of the same, please go thru. (As an attachment below)

The advantages,

1. It obviates the need for data loggers – ensures the purity of data, and shall be very easy to implement.
2. It shall answer scientific questions, will be beneficial for everystakeholder, the Individual, his family, society, the medical fraternity, Government, insurance companies, our Nation et al.
3. Shall build a National EMR database in no time, a 100 million downloads and submission in few months only.
4. It shall be helpful for both Public and private sector, will be a support platform for the medical fraternity as well as their science.

Once this is achieved, the issues like duplicate data, preadmission – preemployment-preinsurance health checkup, the incidence of false claims and many of the distressing issues of current health scenario shall settle down.

In an era when we have a smartphone in every family, an app friendly generation – this can be implemented well enough for 100+ crore indians and for the rest whenever they visit a private or public health facility their profile can be built up gradually.

Kindly go thru the document and the google form.

Regards,

Dr Sachin Kuchya, MBBS MD DNB
Associate Professor in Pharmacology,

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:44:55 +0530

Subject: Fwd: My submission for success of NHS,

----- Forwarded message -----

From: Dr Sachin Kuchya <sachinkuchya@yahoo.com>

Date: Fri, Jul 13, 2018 at 12:22 PM

Subject: My submission for success of NHS,

To: "healthstackniti@gmail.com" <healthstackniti@gmail.com>

Cc: sachin kuchya <sachinkuchya@yahoo.com>

Dear NITI Aayog,

Kindly accept season's greetings,

Thanks for formulating the policy document with an aim to deliver the same by 2022, and also seeking our opinion.

This initiative has two aspects, one is scientific / medical & the other is model for governance & implementation.

Both are described but the medical aspects needs to defined and planned well enough. Why so? I have certain facts and observations,

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<http://annals.org/aim/article-abstract/2546704/allocation-physician-time-ambulatory-practice-time-motion-study-4-specialties>

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NSCB Medical College, Jabalpur (MP)
+91 98272 55744

Ek Bharat Shrestha Bharat



e-Health screening for our country - the Swasth Bharat app ver.16042018.pdf

102K

Health stack NITI <healthstackniti@gmail.com>
To: nita@ispirit.in

Sat, Jul 28, 2018 at 10:44 AM

[Quoted text hidden]



e-Health screening for our country - the Swasth Bharat app ver.16042018.pdf

102K

Mail Delivery Subsystem <mailer-daemon@googlemail.com>
To: healthstackniti@gmail.com

Sun, Jul 29, 2018 at 11:17 AM



Delivery incomplete

There was a temporary problem delivering your message to **nita@ispirit.in**. Gmail will retry for 47 more hours. You'll be notified if the delivery fails permanently.

LEARN MORE

The response was:

The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720> [ispirit.in 50.63.202.63: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: delayed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720>

[ispirit.in 50.63.202.63: timed out]

Last-Attempt-Date: Sat, 28 Jul 2018 22:47:58 -0700 (PDT)

Will-Retry-Until: Mon, 30 Jul 2018 22:14:56 -0700 (PDT)

So my submission is,

1. To have a e-health screening platform, the beneficiary shall login with his Aadhar Number. And answer some basic questions with respect to any of his symptoms, his medical history, current level of fitness or effort tolerance, his life style and family history.
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htt

----- Message truncated -----

Mail Delivery Subsystem <mailer-daemon@googlemail.com>
To: healthstackniti@gmail.com

Mon, Jul 30, 2018 at 12:55 PM



Delivery incomplete

There was a temporary problem delivering your message to **nita@ispirit.in**. Gmail will retry for 21 more hours. You'll be notified if the delivery fails permanently.

LEARN MORE

The response was:

The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720> [ispirit.in 184.168.221.35: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: delayed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at

<https://support.google.com/mail/answer/7720>

[ispirit.in 184.168.221.35: timed out]

Last-Attempt-Date: Mon, 30 Jul 2018 00:25:36 -0700 (PDT)

Will-Retry-Until: Mon, 30 Jul 2018 22:14:56 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:44:55 +0530

Subject: Fwd: My submission for success of NHS,

----- Forwarded message -----

From: Dr Sachin Kuchya <sachinkuchya@yahoo.com>

Date: Fri, Jul 13, 2018 at 12:22 PM

Subject: My submission for success of NHS,

To: "healthstackniti@gmail.com" <healthstackniti@gmail.com>

Cc: sachin kuchya <sachinkuchya@yahoo.com>

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----- Message truncated -----

Mail Delivery Subsystem <mailer-daemon@googlemail.com>
To: healthstackniti@gmail.com

Tue, Jul 31, 2018 at 12:21 PM



Final-Recipient: rfc822; nita@ispirit.in

Action: failed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720>

[ispirit.in 184.168.221.49: timed out]

Last-Attempt-Date: Mon, 30 Jul 2018 23:51:33 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>

To: nita@ispirit.in

Cc:

Bcc:

Date: Sat, 28 Jul 2018 10:44:55 +0530

Subject: Fwd: My submission for sucess of NHS,

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From: Dr Sachin Kuchya <sachinkuchya@yahoo.com>

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----- Message truncated -----

e-Health screening, for our country – the Swasth Bharat© app

Dr Sachin Kuchya, MBBS MD DNB Associate Professor in Pharmacology NSCB MC Jabalpur (MP, India).
Physician, Innovator and Copyright Holder for ADR Reporting© app.

Over the past few years, advancements in medical science have surpassed all expectations. There is a tremendous amount of knowledge yet to be unearthed, esp. if we wish to do research to improve health in tropical & developing countries like our's.

Most of the Healthcare currently being provided to our Country men is through an Informal way, with some data collection at the private / corporate setup but even this is missing at the Government setup. We as a country lack a formal way of collecting health care data in a structured format.

Therefore, there is an Unmet need for Collecting health Care related data, esp for Non Communicable diseases.

This should preferably be done with the help of a digital platform – owing to ease of its implementation, scaling up and updation. IT platforms, which collect data, collate observations & use algorithms to provide differential diagnosis, monitoring, prognosis of a patient are currently being developed, tested and some are even in use.

Initially this will enable quality screening, clinical decision making & holistic management of diseases detected. Later, it may even be used for timely and targeted follow ups, prognostic studies and building of nationwide Case based Registeries.

I would like to put forth an idea from, the field of IT & medicine - **THE SWASTH BHARAT APP** .

The Swasth Bharat app, is basically targeted at detection, prevention and early diagnosis of Non Communicable diseases like Anemia, Diabetes Mellitus, Hypertension, Hypo & Hyperthyroidism, Obesity & their complications.

The app, Intends to promote the clinical decision making based upon the holistic assessment of subject's current lifestyle & on the identification and treatment of modifiable & nonmodifiable risk factors, rather than on the diagnosis, treatment or prevention of individual diseases, alone.

It tries to shift health screening from a, "disease detection model" to an "Integrated, Individually tailored model for subject's well being".

The Demo version has been created and the data has started trickling in. Please mail me at, sachinkuchya@yahoo.com or SMS / Whatsapp me at 9827255744, for an online link to the form.

What the Subject or an Individual will need to do?

The subject will download the app, fill in his / her Demographic details, and answer some simple, user friendly yet very scientific questions regarding his Symptoms, Previous diseases, surgeries, drug allergies, current treatment, present functional capacity, changes over last one year, his dietary, Exercise, Personal & family History (as applicable).

The last section in the app seeks subjects opinion on, "How or in what ways the complaints are bothersome" – what is the effect on the patient's physical, psychological and social functioning?. It also seeks to elicit, "what the patient hopes from medical treatment", if needed?. What domain of outcomes is most important?. Finally, what trade-offs are the patient willing to make, towards achieving the desired outcomes.

These sections can be included, deleted, modified depending upon the need and other constraints.

What the app will do, for the Individual,

It is targeted at Noncommunicable Disease Detection, Prevention, Diagnosis, Monitoring, follow up and Enlightening the subject about his role to promote the awareness regarding these diseases, and how he/ she can help his family/ peer group & society towards prevention, early detection and need for adequate monitoring – followup.

1. It is for collection of data on almost every aspect of health in a very structured manner. These are difficult to enquire about during the brief physician – subject Interview. These are regarding the current well being & Risks to the subject. It will be in various regional languages and Braille compliant, too.
2. It will give an Informal Score of his health status, may raise a signal for the visit to family physician.
3. Once reconciled at Physicians clinic & supplanted with his vitals like Height, Weight, BP, Pulse, SpO2 and a RBS – it will throw up, an instant provisional diagnosis & the tests which may be helpful.

(It will also give normal values for the said tests, matched for age, sex, risk factors & comorbidities involved)

4. The tests once done, the data can directly be entered on the app. Thus building complete medical record.
5. It will give the Non pharmacological measures, which should be initiated / adopted by the subject.
6. Once the treatment is advised to the Individual it is updated on the app, by the treating physician.
7. Better follow-ups, the individual can monitor his / her objective data like BP / Weight/ Blood sugar levels etc – to have an idea of Improving/ stabilizing / deterioration of his/ her health status. This will further improve the compliance, quality of follow ups.

For the Physician –

- 8. It will reduce Physician Fatigue, will help in arriving at conclusions, faster.
- 9. Will bring in informed clients, bring business.

For the Society –

- 10. To improve the Holistic care & Involvement of family physician with the subject.
- 11. Promoting the subject, to get involved with the peer group, family & society, to spread rationale and scientific information about disease prevention & healthy lifestyle.

For the Nation –

- 12. It will help us realize the dream of e-Health screening, Electronic Health records, for our country men.
- 13. Better utilization of abilities of our Physician's, less of medical errors – decreased morbidity & mortality.
- 14. To collect real time data on non communicable disease's pattern, prevalence and Incidence. Will help to initiate research and Outcome analysis, of Nonpharmacological measures, Pharmacological measures, Interventions – among different therapies too.
- 15. If rendered Aadhar Access by Govt of India, OTP led initiation - will help in making the app more userfriendly, in assessing the medical needs & also in achieving, "Health for All".
- 16. A simple thumb impression of the subject, can make all the medical history available – in case of emergencies.
- 17. Better health screening, easier registration and lowering of health insurance / mediclaim premiums (won't require a detailed pre-policy screening).

Other Advantages,

- 1. Its designed in such a manner that it initiates discussion. Will bring in useful data.

2. Each interaction with the physician can be utilized more fully because the basic History has already been entered by the Individual.
3. If the subject requires a second opinion, the whole data can be shared with the consultant, adding another dimension to Telemedicine.
4. Decreased need of documentation & efficient handling of Medical Records.
5. Since its an mobile APP, it can incorporate new Information and therefore will remain at par of with the development in medicine.
6. If the government wishes to seek any information regarding the health care needs – it can invite mass opinion, via the app.

& Disadvantages,

1. It's mainly targeted for detection of & prevention from Noncommunicable diseases.
2. It may predispose the doctor to think in a particular direction and create Bias.
3. It may be targeted to cyber-violations and may lead to violation of privacy.

But these disadvantages need not be worrisome. Creative use of information technologies, will facilitate the organization, presentation and integration of information to arrive at Individualized & systematic clinical decision making and it has been applied in many diagnostic algorithms, previously too.

Eg: A 20 yrs old female with a family history of hypothyroidism complaining of fatigue, breathlessness, constipation, increased weight - will lead to a provisional diagnosis of Primary Hypothyroidism vs Fe -def Anemia, & will suggest the physician / health care professional to get the lab investigation of Hb, PCV (HCT), free T4 and TSH level done.

Later on, the results can be discussed and followed up with the help of a formal consultation.

The Swasth Bharat APP, has the potential to bring uniformity in health screening, disease detection, taking the individualized health screening to the beneficiary, spreading the awareness & achieving the goal of "Health for ALL".

A copyright vide registration no. L-68585/ 2017 dated 13/09/2017, **E – Health Screening, for our Country – Swasth Bharat App©** has been awarded, too.

Jai Hind.



Health stack NITI <healthstackniti@gmail.com>

Suggestion on NHS

5 messages

Dean Ayurveda <deanaybhu@gmail.com>
To: healthstackniti@gmail.com

Sat, Jul 7, 2018 at 9:18 AM

This is a good approach. However, some how a method should be devised to link the society with our traditional Indian culture. Every religion has recommend good way of life style both by physical and mental involvement, but because of urbanization and secularism we are not bal to propaganda these inherent feeling . Basically what I mean ,the traditional food items must be re -introduced as food supplements in the society. The herbal decoction should be added as soup before main food as appetizer, in Hotels. Ye and Niyam of YOGA should be popularized and not only asan and pranayama. These steps are well define in Ayurveda and AYUSH based bridge course may be introduced For modern health workers. The weakness centres will be more effective by adopting these suggestions. Yamini Bhusan
Dean,Ayurveda, BHU

Health stack NITI <healthstackniti@gmail.com>
To: nita@ispirit.in

Sat, Jul 28, 2018 at 10:45 AM

[Quoted text hidden]

Mail Delivery Subsystem <mailer-daemon@googlemail.com>
To: healthstackniti@gmail.com

Sun, Jul 29, 2018 at 2:02 PM



Delivery incomplete

There was a temporary problem delivering your message to **nita@ispirit.in**. Gmail will retry for 44 more hours. You'll be notified if the delivery fails permanently.

[LEARN MORE](#)

The response was:

The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720> [ispirit.in 184.168.221.49: timed out]

Final-Recipient: rfc822; nita@ispirit.in
Action: delayed
Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at <https://support.google.com/mail/answer/7720>
[ispirit.in 184.168.221.49: timed out]
Last-Attempt-Date: Sun, 29 Jul 2018 01:32:23 -0700 (PDT)
Will-Retry-Until: Mon, 30 Jul 2018 22:15:14 -0700 (PDT)

----- Forwarded message -----

From: Health stack NITI <healthstackniti@gmail.com>
To: nita@ispirit.in
Cc:
Bcc:
Date: Sat, 28 Jul 2018 10:45:14 +0530
Subject: Fwd: Suggestion on NHS

----- Forwarded message -----

From: **Dean Ayurveda** <deanaybhu@gmail.com>
Date: Sat, Jul 7, 2018 at 9:18 AM
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To: healthstackniti@gmail.com

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Dean,Ayurveda, BHU

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To: healthstackniti@gmail.com

Mon, Jul 30, 2018 at 3:30 PM



Delivery incomplete

There was a temporary problem delivering your message to **nita@ispirit.in**. Gmail will retry for 19 more hours. You'll be notified if the delivery fails permanently.

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The recipient server did not accept our requests to connect. Learn more at
<https://support.google.com/mail/answer/7720> [ispirit.in 50.63.202.46: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: delayed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at
<https://support.google.com/mail/answer/7720>

[ispirit.in 50.63.202.46: timed out]

Last-Attempt-Date: Mon, 30 Jul 2018 03:00:05 -0700 (PDT)

Will-Retry-Until: Mon, 30 Jul 2018 22:15:14 -0700 (PDT)

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Dean,Ayurveda, BHU

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Tue, Jul 31, 2018 at 11:59 AM

To: healthstackniti@gmail.com



Message not delivered

There was a problem delivering your message to
nita@ispirit.in. See the technical details below.

LEARN MORE

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<https://support.google.com/mail/answer/7720> [ispirit.in 184.168.221.32: timed out]

Final-Recipient: rfc822; nita@ispirit.in

Action: failed

Status: 4.4.1

Diagnostic-Code: smtp; The recipient server did not accept our requests to connect. Learn more at
<https://support.google.com/mail/answer/7720>
[ispirit.in 184.168.221.32: timed out]

Last-Attempt-Date: Mon, 30 Jul 2018 23:29:10 -0700 (PDT)

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Comments on National Health Stack

1 message

IMA Pune <imaofpune@gmail.com>

Mon, Jul 30, 2018 at 4:26 PM

To: healthstackniti@gmail.com

Cc: padma iyer <padma.iyer036@gmail.com>, "Dr. Shah Rajkumar" <dr.rajkumarshah@gmail.com>, Meenakshi Deshpande <meenakshideshpande3@gmail.com>, Rajeev Joshi <rajeevdjoshi@gmail.com>

Ref: IMA/PN/GEN/2018-19/330
30.07.2018

Date :

Mr Amitabh Kant,
Chairman, Neeti Aayog
New Delhi,

Sub : Comments on National Health Stack

Dear Sir,

Please find attached herewith comments from Indian Medical Association, Pune on the National Health Stack document released by you for consultation.

For any clarification in this regard, please contact Dr. Rajeev Joshi, chairman, eCommunication Cell, IMA Pune on 9822084614 or email rajeevdjoshi@gmail.com

With warm regards,

Dr. Padma Iyer
President, IMA PuneDr. Rajkumar Shah / Dr. Meenakshi Deshpande
Hon. Secretaries, IMA PuneDr. Rajeev Joshi,
Chairman, eCommunication Cell
Indian Medical Association, Pune

1	Dr. Vinod K Paul: Visionary Digital Framework : It is now conceivable to aim for digital health records for all citizens by the year 2022.	The goalpost has been shifted from 2020 to 2022
2	Mr. Amitabh Kant: Universal health coverage is undoubtedly a key lever to achieving this goal. Not only does improved health security have the potential to transform individual well-being, it would also allow our nation to fully leverage our strongest asset: human capital.	For this basic requirement increase in budget from 1.3% to minimum of 5%. What is being done is to force doctors to bear losses in patient care.

3.	The proposed National Health Stack (NHS) will thus deploy a powerful technology arsenal, from Big Data Analytics and Machine Learning all the way to Artificial Intelligence and a state of the art Policy Markup Language. A complete redesign of the flow of people, money, and information, as well as a layered approach to providing comprehensive foundational health functions for all states and programs —grounded in an inclusive and interoperable technology strategy.	While using these hi-fi terminologies which sound wonderful to the ear, it is forgotten that use of information technology in healthcare is dismal as of 2018. This policy does not provide any incentive to providers to use information technology.
4	Executive summary: Where All people can obtain health services Anywhere in the country	Is this real requirement? Do people continuously shift from one state to another? Especially does this matter to people who would be beneficiaries of this scheme?
5	Resulting in some of the largest health databases with secured aggregated data that will put India at the forefront of medical research in the world.	What is government's policy to support medical research is not clear.
6	Timely Payments on Scientific Package Rates	To start with the government has started with absolutely non-scientific package rates.
7	Introduction : The scope of this document is limited to stating the vision, strategy and approach for the development of the National Health Stack. ... The operational details of building and rolling out the Stack including the delivery mechanisms and other related matters are beyond the scope of this document.	It will be important to look into the details of operational details, as information given in this document increases suspicion that private healthcare sector will be mistreated.
8	Page 22: An important element of maintaining provider registries will be the role of a surveyor who will be tasked with physically visiting providers and validating registry data. The interfaces for surveyors and data validators will be defined and their role scoped out in detail.	This will amount to increase inspector raj in healthcare
9	beneficiaries will have the authority to grade providers and submit these grades to the provider registry	Providers should have the authority to grade beneficiaries and submit these grades to the beneficiary registry, so that beneficiaries responsible for violence

		against providers will be blacklisted and no services will be given subsequently by providers to whom beneficiaries approach for treatment
10	The registry would allow any number of other identifiers being used in the health system to be linked to the Health ID.	There will create huge confusion, and IMA recommends that Aadhaar should be only health identifier and there is no need of another UHID. It would be prudent to get this approved from the supreme court.
11	Page 24/25: Activation requires that premiums that cover the beneficiary be transferred to the insurance company or health trust.	IMA has consistently opposed involvement of insurance companies and has strongly supported trust model.
12	It is the responsibility of the Centre and State to ensure the funding cycle for any government-funded healthcare programs is correctly managed so that policies do not expire and the poor and vulnerable do not suffer due to policy expiry.	Please not if center / state fail in their responsibility which is quite possible, the policies will fail, but the brunt will have to be borne by provider. Therefore before beginning any treatment, there should be facility to confirm that policy is alive
13	Page 28: When a fraud is reported, all pending claim settlements and any new claim settlements for a hospital are placed on hold until the fraud raised can be investigated.	Here it is assumed that the fraud is committed only by hospital, if any intermediary commits fraud in one case, will hospital suffer for all pending cases?
14	Personal Health Records (PHR) are a core requirement to avoid fraud and bring greater trust into the claim handling process, as most fraud is based upon either unwanted or redundant tests and procedures, or claims made by patients/providers on false procedures.	Who will decide that the tests/procedures are unwanted or redundant and who is going to take legal responsibility for something required to be done is not done due to protocol?
15	a beneficiary visiting a provider, in the absence of NHS Health ID, may auth. against Aadhaar.	Clearly this is circumventing challenge w.r.t. aadhaar in supreme court
16	Page 30 : patient-controlled health-record	There should be facility for patient created health record e.g. entry of blood sugar levels, pulmonary function test etc home monitoring. However it should not be mixed with electronic health record generated by provider and there should be clear demarcation in the NHS e.g. blue line = provider, hospital / doctor orange line = laboratory (red for abnormal) green line = mobile app generated data

		(mHealth projects) yellow line = patient entered data grey line = radiological investigation xray.ct,mri, nuclear medicine etc none of these should be allowed to make entry in other zone so as to avoid confusion and possible misuse in medico-legal matters.
	Page 32:4. Minimal changes to existing health record formats: The diverse IT products used by healthcare providers in India do not follow a common standard for data storage and do not communicate with each other. Therefore, the framework must require minimal to no changes to existing IT products and must be designed to work with the existing IT infrastructure as-is.	This is U turn from initial policies of National eHealth Authority as well as NDHA in which licensing of software as per guidelines prepared by CDAC was to be implemented. It was correct step as all software systems would have achieved some baseline standard. This is example of how government can take U turns on all policies, and we fear that there will be many changes in the policies specified in this document created for NHS. eCommunication Cell of IMA strongly recommends standards based software using ICD and SNOMED-CT for vocabulary and HL7 for communication with NHS so that all software products know exactly how they are going to communicate with NHS.
17	A few examples of data which could be obtained through this framework are listed below	Actionable intelligence for detection of outbreak and prevention of spread of epidemics has been completely forgotten in this entire document. Predicting epidemics is not possible before these two components are achieved with the help of analytics supported by GIS. IF NHS is giving so much importance to PHR, involvement of people in prevention of epidemics should be given due importance in NHS itself.
18	Page 33: Average billed amount / billed amount for a particular medical procedure	This should be done for deciding cost of packages before launching the scheme
19	Page 37: Technology in Healthcare will provide affordability.	This is myth. Basically cost of implementation of information technology has to be borne by the providers, for which some financial incentive MUST be given by government. Recurring cost of manpower and

		bandwidth should be supported.
20	justified pricing, instant adjudication and On Time payment of claims	To start with pricing is far from being justified, and there will be delay during adjudication.
21	We foresee doing away with the need to conduct unnecessary tests as all records will be linked.	Even if records are linked, doctors will need test observations at the time of clinical evaluation, so previous reports will be of limited value
22	Page 38 : Incentivize service providers, via a scorecard mechanism, to set up facilities closer to the beneficiaries	These should be clarified well in advance. Only mention in vision document does not help.
23	A Value-based Purchasing feature can now be introduced as the Stack collates enough data to initiate a reward-based program based on incentivized payments and public reporting for the quality of care they give to patients, productivity and cost control.	Public reporting for quality of care should be augmented with explanation from provider for any negative feedback. Also it is necessary to have mechanism of reporting about beneficiaries also
24	Page 40 : The core intent of the National Health Stack is to enable On Time Payments for the Service Providers.	This statement has failed n number of times and providers will not believe government on this account.
25	The technology stack will enable the distinction between good and bad service providers, as dictated by data, and subsequent recognition /treatment to create a self-sustaining win-win ecosystem in healthcare where better service providers will bubble to the top.	(i.e. those graded better by patients will reach top : please note no value is given to qualification/experience of doctor)
26	The most critical lever in the ecosystem which can bring about a shift is the Service Provider.	And what this scheme is doing is offering rates which are 20% of current charges



IMA Pune



Comments on NHS-tabulation.pdf

367K



Health stack NITI <healthstackniti@gmail.com>

Consultation response on National Health Stack

1 message

Santosh Shevade <santosh@sineflexsolutions.com>

Mon, Jul 30, 2018 at 2:18 PM

To: healthstackniti@gmail.com

Cc: Mahesh Iyer <mahesh@sineflexsolutions.com>, Dinesh Pillaipakkamnatt <dinesh@sineflexsolutions.com>

Hi

Please find attached Sineflex Solutions' consultation response on National Health Stack, Strategy and Approach. We thank NITI Aayog for giving us the opportunity to contribute towards the set-up of this important initiative and look forward to partner in the next steps.

Regards
Santosh

SANTOSH D. SHEVADE

Co-founder

+91 8886406060

santosh@sineflexsolutions.com

www.sineflexsolutions.com

*Partnering for Healthcare Innovation***Sineflex Consultation on NHS.pdf**

58K

NITI AAYOG

healthstackniti@gmail.com**CONSULTATION ON NATIONAL HEALTH STACK, STRATEGY AND APPROACH****30 JUL 2018**

Sineflex Solutions is an innovation management consultancy firm, aimed at acting as a connector for healthcare organizations with innovation ecosystem including university research departments, various start-ups and their incubators and other innovative organizations.

At Sineflex Solutions, one of our key focus areas is to collaborate with healthcare organizations in applying the right digital and technology solutions. For such opportunities, we believe in identifying the right approach through design thinking, assessing right needs, executing the project in an agile manner and at the end helping integrate the solutions in the larger organizational workflow.

With this background, we welcome the opportunity provided by NITI Aayog for consultation on 'National Health Stack, Strategy and Approach'. This consultation comes at the right time, close on the heels of WHO resolution, put forth by India and other countries, on digital health in May 2018, which urged to prioritize the development and greater use of digital technologies in health as a means of promoting Universal Health Coverage and advancing the Sustainable Development Goals.

Our consultation considers 4 major elements of the strategy and approach towards National Health Stack (hereafter referred to as NHS) and provides some suggestions and recommendations for way forward.

Outcome based approach

The strategy and approach document rightly puts the onus of the NHS on providing a digital infrastructure for successful implementation of Ayushman Bharat Yojana. The document also provides broad areas of benefit to various parties including the larger public. However it will be helpful to provide more detailed roadmap towards some of the goals within Ayushman Bharat Yojana and its linkages with rightful implementation of NHS. For such a roadmap, a good baseline of the current digital infrastructure will be essential. One way to do this will also be to link NHS with other initiatives like National Digital Health Agency, implementing key NITI Digital Health activities like Digital Pathology and Imaging Biobank for Cancer.

Privacy & Security

The strategy and approach document puts great emphasis on patient privacy and security. These, coupled with other principles such as interoperability, are much needed components of any digital infrastructure, more so when it comes to digital health data. We recommend that the planning, incorporation and execution of these principles be strictly governed by experts in the field. Several additional steps can be foreseen including penalties for non-compliance with patient privacy requirements. We should also learn from other nations including the UK National Health Services, Australia Digital Health Agency and SingHealth.

Incentives for adoption

In order to reinforce the 'Continuum of Care' principle, we recommend that key components of NHS can be suitably incentivized. Descriptive use cases can be provided including incentives for patients to continue opt-in at various interfaces. We would like to especially think of such cases where patients use more than one healthcare provider and during the multiple hand-offs, data continuity is lost. Similarly, incentivising private healthcare providers to participate in the implementation process will prove beneficial.

Inclusion principles

Our final recommendation will be to continue to incorporate design principles for diversity of uses and users. Although, it might be early to start thinking of such implementation elements, we recommend to identify design elements that will promote highest levels of inclusion for uses and users, thus avoiding inadvertently designing and building barriers to subsequent improvement.

We thank you once again for providing this opportunity of consultation on the National Health Stack, Strategy and Approach. We look forward to continued partnership with various stakeholders for healthcare innovation. If you have any thoughts or questions about these comments, please contact Santosh Shevade at santosh@sineflexsolutions.com

Electronically submitted to NITI Aayog, healthstackniti@gmail.com



Health stack NITI <healthstackniti@gmail.com>

National health stake(NHS): reg

2 messages

Kenneth Chakma <kennethchakma2008@gmail.com>

Sun, Jul 8, 2018 at 8:08 AM

To: healthstackniti@gmail.com

Hello sir/madam,

In regards to the notification : comments for creation of national health stake, I wish to highlight some key points too.

1. In remote areas of northeast india till now digital connectivity is a distant dream. The creation of NHS will require consultation with the existing schemes of digital mission in NER. According to the progress of these schemes framework of NHS need to be created.

In areas without digital network, mobile phones can act as a medium for the citizens to communicate their diseases through TEXT MESSAGE. LOCATION, TIMING OF THE DISEASE AND NAME or ADHAR NO need to be mandatory. The Primary health care can compile the various health cases through mobile network and send it to the higher authority. This wont require any hi-tech broadband service too. Thus will be cost effective.

According to the information state to state policies can be updated. In mizoram there is high incidence of malaria and HIV. Accordingly NHS can target areas where the situation is critical. The timing of the diseases can also help the district administration to tackle the problem before it arises in subsequent years. Bringing services directly at the doorstep of these critical areas will cut down cost for the tribals in remote areas where it takes more than 3 4 days to reach the destination. Mostly during the monsoon season when landslide is frequent .

Major challenge in the whole operation will be the mode of communication. Thus the NHS need to cater to the local languages too for dissemination of information seamlessly.

Hope my suggestion is given due cognisance.

Regards

Kenneth Chakma
Geologist
Geological survey of india
Agartala.

Health stack NITI <healthstackniti@gmail.com>

Sat, Jul 28, 2018 at 11:00 AM

To: nita@ispirit.in

[Quoted text hidden]



Health stack NITI <healthstackniti@gmail.com>

Health stack

2 messages

Jasjit Kohli <jasujat20@gmail.com>
To: healthstackniti@gmail.com

Sun, Jul 8, 2018 at 6:51 AM

The initiative of National Health Stack is a good idea if it can be implemented.

Akin to capture of Unique Identification through Aadhar the family medical history can be mapped and also enable health planners and pharmaceuticals cos to ensure better delivery of medicine s in an area.

The sale of drugs should also be linked to the medical history available from this data as to a cancer patient or diabetic patient in the family.

Record of last visits to a medical practitioner requires to be networked and logged. Corporate hospitals have their own UHID which keep a track of visit to a particular hospital, not of any other visit anywhere else.

Health stack NITI <healthstackniti@gmail.com>
To: nita@ispirit.in

Sat, Jul 28, 2018 at 10:59 AM

[Quoted text hidden]



Health stack NITI <healthstackniti@gmail.com>

SUGGESSTIONS FOR NHS - Dr. Jayanta Bhowmick, Vadodara, Gujarat

2 messages

drjayanta bhowmick <drjayantabhowmick@yahoo.co.in>

Sun, Jul 8, 2018 at 3:14 AM

Reply-To: drjayanta bhowmick <drjayantabhowmick@yahoo.co.in>

To: "healthstackniti@gmail.com" <healthstackniti@gmail.com>

Dear Sir/Madam,

Please find below few of my suggestions for the upcoming NHS Scheme of the Govt of India.

1. Ayushman Bharat Scheme :

1. It should be completely **paperless, cashless, and online**. There should be no paperwork at all. All records should be in electronic form. Health records should be preferably in Electronic form (EMR-Electronic Medical records). EMR or scanned digital scanned copies (Hospitals not having EMR) should be uploaded online, realtime/or in a time bound manner. There should be no unnecessary paperwork and courier work (primitive system). Whole process should be completely **online on a portal**, wherein Hospitals can Logon and find status, upload required documents and reconcile accounts.
2. **Online Grievance Redressal Mechanism**: Time bound Grievance redressal.
3. **Corruption free**: No human to human interaction. No inspections (**No inspector raj**). Every data should be monitored online instead. There should be no corruption in empanelments, payouts, reimbursements, etc. Strong anti corruption monitoring and guilty should be punished with criminal prosecution. Similarly Action should be taken against Hospitals indulging in Malpractice or Corruption in the form of criminal Prosecution. Adequately trained and qualified persons should be there to monitor the things. Uneducated politicians should be kept away as far as possible from any official posts.
4. **Immediate time bound payments** in a cashless manner with complete details of each case maintained in the online portal of all healthcare centres.
5. **Practical package rates** as per **prevailing market rates** (Not the abysmal CGHS/ECHS/RSBY rates) which can allow providing Quality Healthcare services. Many had to discontinue RSBY/CGHS/ECHS due to unrealistically low package rates which were inflation proof and not revised for 7 years.
6. There should be **no deposit asked from healthcare centres for empanelments**.
7. Non BPL population (**APL General Population/citizen**) should have option to get the benefits by paying similar **self contributory insurance premium**. Not all schemes should be only for BPL population. Middle class gets nothing. The Scheme should be a **Universal Health Coverage** and not only a Scheme for BPL population. Of course Premium contribution can be taken from Non BPL population, wherein they can get a good Rs 5 lakh Coverage for the family at a low premium.
8. Also **BPL data should be accurate** so that actual deserving people gets the benefit and not wealthy people with political connections getting the benefits (As in RSBY)
9. **Adequately qualified Medical persons (Minimum MBBS)** and not Quacks are there to Scrutinize on verifying medical facts. In RSBY Insurance Companies used to employ Quacks (Homeopathy/Ayurveda) for scrutinizing treatment plans of

Modern medicine specialists and superspecialists. Every thing should be online. There should be no scope of unnecessary harassment/corruption.

10. **Incentivise Quality** :Healthcare Centres going for accreditation (NABH/ISO,etc) for promoting Quality Healthcare should be promoted by having preferential empanelment, special package rates,etc (eg. 25% more)
11. **Empower the Consumer**:Let the Consumer Select, from where they want treatment. Just Insure them and empower them to select a hospital, not forcing anyone to take treatment from only Government setups.
12. Legalize, Coverage and special promotion for **Digital Telemedicine Dispensaries** for OPD Services in Interior rural areas where there are no hospitals, doctors.
13. **Maximum participation of Hospitals**. There should be basic minimum criteria for empanelment of Hospitals.Process should be automatic and online without any middlemen, any inspections,etc to prevent corruption.Package rates should be balanced according to prevailing market rates and revised every year .All Hospitals should be invited to participate in the scheme.
14. **Foolproof** Fully IT Optimized , Modern **authentication system** for users (Biometric, Aadhar,etc). Option for other methods other than fingerprints should be there as Senior Citizen face lot of problem in fingerprint authentication
15. **Full Coverage of Diseases**: There should be Full Coverage of All diseases, pre existing illness, all ages, new borns,etc
16. Special Coverage for **Preventive Health Checkups**, which includes, OPD, Radiology and Pathology Services.
17. **Single Enrolment** of benefeceries. Enrolment should **not** be done every year as previously done in RSBY which consumes enormous time, and money unnecessarily.Once empanelled it should be valid for minimum five years, with conditions. Enrolment process should be online can be done for Government setups , Government Hospitals, Private Hospitals (Voluntary).If possible, it will be best if anyone can apply himself/herself (**Self Enrollment**)on the portal itself for enrollment without the need to visit any enrolment kiosk (like a PAN Card), by Aadhar authentication by mobile OTP. Process should be fast and simple as it can consume lot of time and has potential to complicate or mess up things.APL (Above Poverty Line) benefeceries should be able to pay online and get them self enrolled in the scheme.
18. **Cheaper medicines**: Empanelled Hospitals (Private and Govt) should be provided optional supply of Quality Generic medicines, disposables, Surgical goods form the Government Jan Aushadhi kendras to cut down the cost of Medicines.
19. **Some type of Funding/Investment** and Tax rebates can be provided to Hospitals wishing to establish Hospitals in Rural interiors, so that real interior villages can get quality healthcare services.

We were the first to join the RSBY Scheme when Launched, and participated it in our rural hospital for more than 5 years.We know all the practical difficulties and flaws in the scheme.Ultimately we had to discontinue due to the enormous difficulties we faced as mentioned above.I am always available for any suggestion, or help whenever required.

We all hope to see the scheme a grand Success.

Thanks and best regards,

Dr. Jayanta Bhowmick ,**(MBBS, MS,FMAS,PGDHMM)**

Senior Consultant Surgeon and Director,

Bodeli General Hospital, Bodeli**Medistar Hospitals, Vadodara.****Phones: 91-2665-220712/220721/222711/9825356748****FAX:91-2665-220713**<http://www.bodeligeneralhospital.com><http://www.medistarhospitals.in>**(An ISO 9001:2008 certified hospital)**

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Health stack NITI <healthstackniti@gmail.com>

Sat, Jul 28, 2018 at 10:59 AM

To: nita@ispirit.in

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Health stack NITI <healthstackniti@gmail.com>

Standardization and Data protection

2 messages

Prabir Chatterjee <prabirkc@yahoo.com>

Sat, Jul 7, 2018 at 8:43 PM

Reply-To: "prabirkc@yahoo.com" <prabirkc@yahoo.com>

To: "healthstackniti@gmail.com" <healthstackniti@gmail.com>

Centralized is risky. A standardized format which can be transmitted between facilities is useful. Veteran Administration probably has such a system in USA. Big data and analytics with names, identities is an intrusion of privacy. And the dangers of Analytica- the possibility of targeted campaigns to benefit the highest bidder arise. All big data analysis should be on unlinked data (eg by PIN code, not by Aadhar number)

Prabir Chatterjee
MD Community Medicine (Vellore)

Sent from Yahoo Mail on Android

Health stack NITI <healthstackniti@gmail.com>

Sat, Jul 28, 2018 at 10:59 AM

To: nita@ispirt.in

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Health stack NITI <healthstackniti@gmail.com>

Idea regarding National Health Stack

2 messages

Parth Yadav <parthyaduvanshi94@gmail.com>
To: healthstackniti@gmail.com

Sat, Jul 7, 2018 at 3:48 PM

Respected sir/ma'am

This is in regard to your kind invitation of inviting public comments for the above-mentioned subject. My suggestion/comment/idea is that for National Health Stack, the use of BLOCKCHAIN technology must be looked at. As blockchain works without a third party interference (which will lead to significant reduction in logistical costs), and is secured and much more transparent than AI or Big Data, it is ideal for implementing this innovative idea of a comprehensive National Health Stack.

My suggestion is this: there should be a constitution of NITI Aayog sponsored research team for looking into the usage of blockchain technology for NHS. This should be supplemented further by Big Data analysis (for which experts from private sector, especially digital corporate sector must be invited) and should be complemented further by application of machine learning AI (for which expert scientists from IIIT, IITs and IISc should be invited).

Many countries of the world are looking at Blockchain technology. It is surely going to disrupt the digital space in the coming decade much like what Internet phenomenon did in the 90s. Therefore, not only this initiative will be making NHS seamless, transparent and efficient thereby, furthering the Honourable Prime Minister's vision of Less Government, More Governance as well as Good Governance, it will also lead to sparking the discussions, debates and research regarding the Blockchain technology use in the country. As this 21st century is deemed to be the ASIAN CENTURY, it is imperative on our part as a nation to take the lead in new technologies. The Blockchain technology has immense potential and will prove to be one of the 'power spheres' of the post-modern technology driven Anhtropogenic age ushering into clear, transparent and accountable Governance systems and Social Justice programmes.

Health stack NITI <healthstackniti@gmail.com>
To: nita@ispirit.in

Sat, Jul 28, 2018 at 10:59 AM

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Health stack NITI <healthstackniti@gmail.com>

Suggestions on National Health Stack

2 messages

Chinmay Kashid <chinmaykashid1@gmail.com>

Sat, Jul 7, 2018 at 6:26 AM

To: healthstackniti@gmail.com

Sir,

With increasing reliance on digital technology, use of modern technology in healthcare sector is inevitable. Here are some of the things I think might be gamechanger.

1. Built a vault like app (like icloud) where one persons medical history can be saved with high level of inscription so that his/her data remains safe. And is accessible whenever required. So that he doesn't have to carry his medical reports everytime he visits clinic.
2. Built a similar national registry of medical professionals with expertise in various sectors so that this data can be accessed by common people for their own good.
3. Set up a standard procedure of tests for certain medical problem. So that, future cost of certain health problem can be detected earlier. This way more transparent engagement between patient and hospital can be ensured.
4. Use of modern techniques such as big data to form a sector wise 'Health Inventory' so that data is collected state/district wise regarding moat occurring health problems within various timeframes. With this available data, more accurate and sustainable policy can be formulate.

Regards,

Chinmay D. Kashid

Pune-MH

9881456370.

Health stack NITI <healthstackniti@gmail.com>

Sat, Jul 28, 2018 at 10:58 AM

To: nita@ispirt.in

[Quoted text hidden]



Health stack NITI <healthstackniti@gmail.com>

Comments on the National Health Stack document

2 messages

Aaditeshwar Seth <aseth@cse.iitd.ernet.in>

Mon, Jul 16, 2018 at 10:38 AM

To: healthstackniti@gmail.com

Dear Sir/Ma'am(s),

I went through the National Health Stack Strategy and Approach Document, July 2018, and have the following comments for your consideration.

High level comments

1. The document laudably places user consent as the first design guideline for the architecture, but right from public architectures like Aadhar to private services like Facebook, which also emphasized about user consent, so far it has remained a myth. Even highly educated and technology savvy professionals like ourselves are clueless on how our data is being used, what rights do we have over the data, and what did we really give our consent to. Placing this as a goal when it comes to poorly literate people and marginal users of information technology at best, is unrealistic unless adequate thought is not put into what kind of data flows are needed or not needed. Where is individual level data needed, where is aggregate data needed, at what levels is it needed, are all important questions that should precede any discussion on the technology architecture so that it is clear what goals the architecture indeed has to achieve.
2. The document mostly talks about health insurance services, and lists a few problems that these services have seen so far like low utilization, but it does not outline the reasons that caused these problems in the first place. It is well known that low awareness, spelling mistakes in insurance cards leading to rejection, discriminatory practices of private health providers, etc were the key reasons why schemes like RSBY have faltered. Unless these reasons are not articulated, jumping to the design of the technology architecture is premature, because it is not clear what problem this architecture should be designed to solve.
3. Aadhar is considered as a key part of this architecture but the problems therein are well known, with NREGA wage payment delays, PDS denial, etc, and all this in a context where the key beneficiaries are not technology savvy or empowered enough or have the required time on their hands to be able to interface with the concerned authorities to fix these issues. Bringing Aadhar or other such architectures into the health domain without first fixing them, will only make matters worse -- people are struggling because of Aadhar with wages and food, and now they will have to deal with the same problems even with their health. The architecture should be capable to work even without Aadhar.
4. Overall therefore, my view is that this discussion on a health stack is premature without having first understood the core problems, only then should we think about a technology architecture to solve these problems.

Medium level comments

5. There are no grievance redressal channels outlined. Grievance redressal remains a problem in the current services delivery systems, and will become even harder when machines governed by data will make mistakes. Problems will arise on both fronts, on the quality of the data itself which remains an unsolved problem as is seen with MCTS and other health systems, and also on decisions made based on the data which can have errors or biases in the algorithms. Methods are needed for people to appeal against decisions made by a machine, and for the system to take into account parameters that wouldn't even have been fed into the machines in the first place.
6. Algorithms and automated rules used by the system should be made public, people should be able to understand the reasons behind decisions made by the algorithms, be it in the calculation of premiums or claims, and the ideologies that go into the coding of the algorithms should be opened up for debate. There are interesting initiatives in progress around the world on algorithmic accountability and on crowd-sourced

policy making, technology should first be applied towards these goals than to continue down the path of technology driven algorithmic opacity that dominates so many systems in the world.

7. Methods should be incorporated so that users can get assistance from mentors, social workers, and other well wishers to help them handle the complexities of technological systems which they are expected to interface with, be it in terms of providing their data, or verifying their data, grievance redressal, etc. Making everything individual driven and centralized stands the risk of not being used at all because of shortfalls on technology capacity and human interfaces for the poor or elderly or anybody for that matter, as has been seen again and again in the domains of PF/ESI for industrial workers who are not aware of how to deal with these systems, NREGA workers who cannot query their own accounts themselves, RSBY or Aadhar where people have not been able to easily engage with enrollment agencies, etc.

Low-level comments

8. Why is family-ID needed? Families change, they grow, they split, they join, they move, they reduce, and even many friends are like family... families are complex and it is not clear why this data is even needed.

9. A clear pilot testing and architecture maturity plan should be put in place, before any consideration of a mass rollout of the system. Human lives are too precious to be sacrificed in the name of "teething problems", and enough examples in recent times itself like demonetization and Aadhar are evidence of grave problems that people have to endure towards goals that have not even been properly articulated.

I am a technologist who has worked on building technology systems for the underserved since more than a decade, and I have come to realize the risks that such systems carry if not designed with adequate thought, and with processes to deal with re-design and alterations based on experience and feedback received from the implementation. Thanks for the opportunity to provide my comments, and I hope they will help fine tune this effort.

best

Aaditeshwar

Health stack NITI <healthstackniti@gmail.com>

Sat, Jul 28, 2018 at 10:57 AM

To: nita@ispirit.in

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Health stack NITI <healthstackniti@gmail.com>

Comments on the National Health Stack paper- open for consultation

2 messages

Suchitra Mankar <suchitramankar@gmail.com>

Thu, Jul 26, 2018 at 10:53 PM

To: healthstackniti@gmail.com

Cc: suchitra.mankar@doorstephealth.in

Dear Sir,

I am an entrepreneur, started telemedicine enabled primary care services after 30 Years in the armed forces as a Doctor. I am at Pune

My queries:-

1. How would the current softwares used as HMIS, in hospitals, or pharmacy softwares or telemedicine platforms integrate with the national health stack? How would data already On these platforms be merged into the new platform? If this can be openly discussed it would allay a lot of misgivings and apprehensions that this paper may generate for private players developing platforms.
2. What is the time frame that one is looking at for this health stack to be operational?
3. While it is a great idea to integrate all levels of health on a platform, would Primary, secondary and tertiary care also get tracked parallelly? Meaning, since I may like to Provide telemedicine at a primary level, could I have community of primary care providers on the platform?
4. Lastly, would e-learning for first aid be enabled in the NHS?

I would love to be part of this exciting new venture. I would be keen to help in setting up of wellness Centres in a PPP model. Good luck.

I look forward to a reply.

Dr (Gp Capt) Suchitra Mankar Founder Director
Doorstep Health Services Pvt Ltd
www.doorstephealth.in
Mobile 8888833800

Sent from my iPhone

Health stack NITI <healthstackniti@gmail.com>

Sat, Jul 28, 2018 at 10:57 AM

To: nita@ispirt.in

[Quoted text hidden]



Health stack NITI <healthstackniti@gmail.com>

Webinar on NHS by Naavi

1 message

naavi iadpp <naavi.iadpp@gmail.com>

Fri, Jul 27, 2018 at 6:58 AM

To: healthstackniti@gmail.com

Dear Sir

I am Naavi, founder of www.naavi.org.I am also the promoter of the "Privacy Knowledge Center" (www.privacy.ind.in), www.disha2018.in and the proposed Indian Academy of Data Protection Professionals (www.iadpp.in).

Considering the importance of NHS I am proposing to conduct a Webinar on July 20, 2018, at 8.00 pm IST.

Details are available at www.naavi.org, www.privacy.ind.in and www.iadpp.in.

I would be glad if you can depute an official representative to the webinar so that clarifications if any from your side can be provided. Otherwise, I will try to provide whatever introduction is required to make people familiar with the scheme.

I will be preparing a PPT for the purpose and in case you have any material that you can share with me, I would welcome it.

Naavi

www.naavi.org



Health stack NITI <healthstackniti@gmail.com>

Great start !

1 message

Pulmonary <indialungdoc@gmail.com>

Wed, Jul 25, 2018 at 12:32 PM

To: healthstackniti@gmail.com

Dear Team

Great work . Sincerely hope this helps India .

Can we ensure that pre-existing conditions and outpatient services are included as a necessity for all health insurance providers to cover ? A lot of fraud and declined claims happen because of this .

Also , inpatient as well as ICU data analytical should be included for analysis and create megadata sets that can be mined for India specific insights .

TelelCU is an evolving space and we can provide assistance in developing this area .

With regards ,

Sai

Dr Sai Praveen Haranath**MBBS,MPH,FCCP****American Board Certified in Internal Medicine,Pulmonary and
Critical Care Medicine****Senior Consultant Pulmonologist & Critical Care Specialist****Apollo Hospitals, Jubilee Hills,
Hyderabad ,India****Medical Director, Apollo eACCESS Tele ICU services****Global Governor at Large, American College of Chest
Physicians(ACCP)****Ex-Officio, Disaster Response Network Steering Committee, ACCP
Member, Pulmonary Physiology , Function and Rehabilitation
Network Steering Committee, ACCP****91-98664-15551****indialungdoc@gmail.com**

Sent from my iPhone



Health stack NITI <healthstackniti@gmail.com>

Comments on the National Health Stack document

1 message

Sundeep Sahay <sundeeps@ifi.uio.no>

Sun, Jul 15, 2018 at 10:46 AM

To: "healthstackniti@gmail.com" <healthstackniti@gmail.com>

Dear Sirs,

I have gone through the National Health Stack Strategy and Approach Document, July 2018, and provide certain comments below.

1. Firstly, it is laudable, the country is thinking about a digital infrastructure for the country, to enable a more holistic and comprehensive approach for strengthening health information systems and their use in the country.
2. The document focuses on electronic health registries (EHRs) and insurance claims (frauds etc). I think there are many unanswered questions in both of them.
3. The backbone of the current national HIS is the HMIS, comprising largely of aggregated monthly data. There is next to no mention of this HMIS data, and the implicit assumption on reading the document is that all will be converted to EHRs. This is surely not required and also close to an impossible task for various reasons. A key question to ask is where and why we need case based data and where aggregate facility based data. For managing health programmes at the national level, we need aggregate based indicators, and at the point of care, for certain diseases, we would need patient based data. To believe that everything should we converted to EHRs, which should flow into national servers would be extremely problematic. The experience of the MCTS should be studied to understand why such an architecture does not work. Similarly, systems for HR, transaction level data needs to be stored and used only at the facility level, while aggregate indicators for example to understand gaps in HR or training needs is required at higher levels.
4. A large focus of the NHS document is on insurance system. Currently, in the primary care systems, there is no cost related data being captured. When we talk of universal health coverage, where the aim is to provide financial risk protection, related indicators cannot be captured without accessing cost data that patients incur in accessing health care at the facilities. So, there will be a need to completely redesign the primary data collection registers, to collect such data. We must also consider the extra work which the ANMs/ASHAs will have to incur in capturing this data, and the workload it adds to

their existing work where they have to manage 20+ registers. Unless primary data collection instruments are redesigned keeping the workload and effectiveness of the ANMs/ASHAs as a central concern, the system on top of it will be on shaky foundations, as the MCTS case teaches us.

5. How are we going to convert all our national vertically managed programmes to EHRs? WHO is providing the country with technical advice on respective systems for HIV, TB, Malaria etc. They have recently released standard modules for these diseases on open source platform, which includes metadata and analytics for both aggregate and case based reporting. Nowhere do they emphasize that there will be no need for aggregated reporting and everything will be changed to EHRs. How will the country reconcile the design of their systems to these global standards? I think this is an important issue to consider.

6. What are the implementation mechanisms for our standards, existing and emerging. Currently, we have policies for the use of open source systems and Open API access. These don't work, as even the national HMIS web portal does not provide Open API access to state systems even though they say they are working on it. We have been trying to negotiate with the HMIS portal developers for such access for many years, have not been able to do so. So, policies without adequate compliance mechanisms are largely irrelevant. Similarly, the NIN has been developed but is currently unusable as it is deficient in many areas - it is incomplete, it does not specify organization hierarchy, it is not dynamic etc. When a user tries to use it, when he/she finds limitations, there must be an agency at the central level with whom they can interact to bring in the revisions. No such mechanism exists, and the standards end up becoming unused monuments. Same is the case for the MDDS standards and more.

5. On data analytics, while it is good to have that as a key focus, the NHS document emphasizes fraud analysis. I wonder if that should be a focus, or should the focus be on strengthening key health outcomes, for which we need a very different analytical focus, varying by health programmes and administrative levels. The other question to ask here is does the central level have the capacity and required tools to conduct such an analysis. An examination of the MCTS experience will tell that is not the case. And if we are going to expand the data flow a 1000 times through EHRs, what are we going to do with this data, and we will in fact be disempowering the local levels to provide effective care and improve health outcomes which should be our primary focus.

I hope some of the above comments and concerns of a citizen of India who has worked in this domain for more than 2 decades will be given due consideration.

Thank you for the opportunity to provide my comments.

Warm regards

Sundeeep